COMP

By Michael Vizard

Confused developers try IS to gain app control to untangle Win32 web

By Michael Vizard

SERWAND WASK

pers begin planning their application development strategies for 1994 and beyond, many said they are becoming lost in a maze

There isn't really e good chan-

nel for plugging into where Microsoft is going. We're kind of surprined to find out how hard it is to find out where the next shoe is going to drop," said Bill Niffin, a de-

veloper at Varitee Corp. in Birmingham, izes in creating applications for the bealth

care industry.
According to Microsoft, about 75% of the applications being built today for its 32-bit Windows NT operating system are being constructed using the Win32s kit. That kit is a subset of the full Win32 kit that allows Windows applications to run on

oth the 32-bit Windows NT and 16-They cited the proliferation of Mi-erosoft Corn. Win32 developer's hit Windows 3.1 platf The Win32s kit does not supp

gramming constructs, such as Microsoft has left many developmultithreading on reduced iners concerned about picking the struction set computing platform wrong development environment, which could have serious conse-

SEW YORK

Microsoft Corp. will preview a sands of PC applications dis-persed throughout their organiza-

While IS managers are happy to see progress in the area of appli-cation integration, there is some concern that Microsoft's offering is unavailable to third parties to in-

corporate into their own applications. But Microsoft's com macro language will link to third-party applications through its Ob-ject Linking and Embedding facili-

Microsoft adds macro language to integrate its packages

on to take control of another The arrival of the common ro language, which : Chairman Bill Gates will

running on forth the beginning of a Microsoft push to tightly integrate its application software [CW, May 31]. Based on the compa-

is called Visual Basic progra ming systems, Applications Edi-tion, and is intended to give IS



Sun boosts net management

MOUSTAINVIEW, CALIF

San Microsystems, Inc. is preparing to fight off IBM and Hewlett-Packard Co. encroachments on its network management turf. San will go on the offensive with a salvo of help features aimed at the less SNMP-eavry user, a company spokesman confirmed last week.

In the works are a user interface based on the Open Software Foundation's Motif, as well as more functional utilities for managing different applications and views of the enterprise

ork, according to Steve Borcich, pr velopment manager at Sun.

hopes, will satisfy some long-term user run blings and belp extend the company's reach be-youd the OEM market and its workstation base into end users' multivendor networks.

The enhancements will come none too as if SunNot Manager is to compete effective with HP's OpenView and IBM's NetView/B for a place on the short list for corpora now shopping for enterprise network ma

Spindler likely to prune Apple orchard as \$150 million of the

rm's \$600 million R&D budget may be The ascension of Michael H. Spindler to chief executive officer at Apple Computer, Inc. In addition, ana-lysts predicted that

is expected to have serious repercussions on the Macietosh line and could sound the death knell for products yet to be released. manlike leader, redevelopment proplaced the more vigrams that have cut into Apple's overbead mary John Sculley

as CEO 10 days ago and expense struc-(CW, June 21). He is ture, analysts said last week. Apple inpare some of the exeiders said as much

> SERIAL PUBLICATIONS 300 H ZEEB RD

BEXEBJFTERANGEMENTS 5-DIGIT 48103 **SUTUTZE 300H0990398** UNIVERSITY MICROFILMS INT 0780 UNDVERSITY MICROFILMS INT 6 XC NT 48103

their jobs in layoffs during the coming declined to come on the report. Sculley's shift "is Spindler, page 20

anywhere from 1,000 to 2,000 people in Ap-ple's 14,000-member work force may lose

CW Report: Portable computing

Invisible staffs and other mobile mysteries

See stories pages 97-146.



Table of Contents

NEWS

nIBM is expected to add new features to the AS/400 in an effort to pit it against PC-LAN serv

ers. Page 4 @ Users say that an mobile computing becomes more important, the problems with it get bigger.

BA lack of consensus hurts the chances that a PCMCIA standard will be reached this year.

Page 4 *Performance questions are likely to ham widespread use of ODBC drivers in client/

server applications. Page 6 Microsoft steps up its drive to push support responsibilities onto hardware vendors that

bundle its software. Page 6 Sun and Novell agree to bring internetwork and NetWare management under the same

eIBM delights developers by relinquishing some control of its key APPN technology

"This week's PC Expo will offer attendees a walking tour of bleeding-edge technologies.

Page 14 ■IBM plans to include "full-function" utilities in PC-DOS 6.1. Page 15

"Users find that a basketful of new

pricing options is no picnic. ADVANCED TECHNOLOGY

An on-line prototype system in England,

nal satellites, will give passengers access to fares and bus locati as they wait for their bus to arrive. Page 28

DESICTOR COMPLITING

WAs pen computing shifts from a market to a technology, it shows signs of new life. Page 49



dust: IS Chief lan Scites (left) said that at first peo re afraid; for end user Kath en Pogg, change

David Coursey offers up his "modest propos

al" for nationalizing Microsoft Page 49 WORKGROUP COMPUTING

"Database replication catches on, but the technology is still unproved. Page 61 Box office smash Jurasnic Park puts Unix workstations and object-oriented programming to the test. Page 64

ENTERPRISE NETWORKING

■ IETF and Cornell University have begun delivering desictop videoconferencing over the internet Page 71 Sorint and the MCC consortium stitch together a service for internet-based commerce.

Page 71 LARGE SYSTEMS

BHP wedges multiprocessor Unix machin between its highest end servers and midrange minis. Page 81

APPLICATION DEVELOPMENT

IBM tries to rejevenate AD/Cycle by bundling Seer Technologies' client/server communica-tions code into future Cycle software develop ment products. Page 91

CW GUIDE TO MOBILE COMPUTING Making sense of new notebook features as well as the latest technique

for remote access. Page 107 IBM garners high user-satis ratings among top color models.



@ Re-engineering works best when you overhaul systems as well as processes. Page 149

■ Data security management: Loners need not apply. Page 153

MARKETPLACE

Page 141

WA quick inspection can help determine if a cheap, no-name PC clone is a dud. Page 161

COMPUTER INDUSTRY

Start-up Novadigm takes on the market for software that manages computers throughout an enterprise. Page 169

Amdahl and EDS form a joint venture to target cross-platform application development. Page 169

alendar	Proc (0)
ompany Index	
W Guide	Page 107
ditorial/Viewpoint	
riday Stock Ticker	Page 168

me developers are getting lost in conflicting directions om Microsoft about how to develop for future ver-From Microsoft about how to develop for future versions of Windows. About three quarters are using the least-muctional Winsich tool kit, which doesn't provide which was the provided that the provided with the provided with the work will provide a common many capture for its applications, but other commercial developers apparatly won't have an easy may to use it in their products. Page I. Its phone lines jammed, Microsoft pushes more fits support load onto hardware vendors. Page 6

ad jobs of not only IS but n new and end users as well. Page

pawned more paperwork and secision-making, and some sers are less certain that they users are less certs are getting the best deals.

well will con network management system using SunNet Manager to proew of the network, while c NetWare issues. Page 8. 5 s also readying a sulvo of help stures simed at the less S vvy users. Page 1

It's crunch time at Apple as Mi-chael Spindler takes over as CEO. Analysis expect Spindi cut R&D and lay off up to 2,000 employees. The next year st be rocky because innovative

Introducing SyncSort for UNIX

The World's Leading Sort Is Now Available for UNIX

Full Functionality
Lightning Speed
World-Class Customer Service

Call (201) 930-8200 to get your copy today



bers from fracturing the standard. If the PCMCIA cannot enforce its star

PC cards will not become as interoperable as Roppy disks, which will burt their

stance in the market The PCMCIA recently app headed toward delivering a solid. stable standard for all PCs as early

as the end of this year (CW, May

31]. However, speakers on a

PCMCIA panel at the Lap and Paimton Show here said it is more

likely that a consensus will not be

The PCMCIA standard should also let users exchange cards

among diverse systems, such as

Unfortunately, the marketplace is pro ing these things as being generic," said Sam

Walker, vice president of sales at Apex Data,

inc., a Dublin, Calif., maker of notebook peripherais. 'We're far, far from that.'

Walker said the problem lies with systems man

ufacturers that are trying to maintain some lev-

el of differentiation in a competitive market. Most systems vendors, even in the intel

Intel Corp.-based notebooks and

reached until mid-1994

years away from reality.

Striving to be unique

AS/400 retooled for NetWare service

SOCRESTER MINT

to add client/server functionalit to its low-end Application Sys st Intel Corp. I486- and

The rollout, which foll er IBM promises, is expected to inde a move to make the central casors now used in the highand 9406 models available as options on the lower end 9402 and A series for use in file server ap-

IBM is also said to be planning o move some file proces ality from the AS/400's CPU to ts I/O processors to incresse file ing and downloading per-oce. In addition, streamining is anticipated in the number of etions in the OS/400 operatcording to David Andrews, man aging partner at ADM Consulti in Cheshire, Conn.

Andrews said IBM may also make Novell, Inc.'s NetWare network operating system directly available on the AS/400 as part of the client/server strategy: An IBM spokesman would not confirm or deny the reports, but he said it is "no secret that client

server is our direction" for the

Stendy but slow While the AS/400 already func ne as a solid dalabase server. drews said, it currently is "sig-

ificantly slower" at uploading ad downloading files than 486sed systems equipped with Nete. "It will do that job. It just won't do it very fast," he noted. The moves IBM plans should make the AS/400 "a viable hybrid ver which offers great perf ance" and lessons the need for ers to put a separate 486 or Pen-

n box alongside it to handle file ring, Abdrews said. Rich Kolbe, director of MiS at laricy-Davidson, Inc. in Milwau-ce, said he was pleased by the re-"The idea of having som g a little hit better to take advantage of PC networks, and of using the AS/400 as a file server in a more fluid manner, is something that appeals to me," he said.

Teresa Elms, president of the Elms Information Services Gre uitancy in San Diego and an

ow one-third of all terminals ated to AS/400s are PCs. The re-

rted plans "would be consi with IBM's strategy," she said. They finally got the religion. But Andrews said he does oot expect IBM to compete on price with 496-based servers. He is looking for the AS/400 to be position

as a higher end system that does both file and database serving while providing robust systems

Offering the higher end CPUs on the low-end AS/400s would likely ake sense in PC LAN server aplications where the work load would probably be high enough to keep the faster processors busy. Andrews said

world, require card vendors such as Apex to write drivers specific to systems, although IRM and Grid Systems Corp. have systems that come bundled with PCMCIA socket services

> ology will convert today's analog octiular network, which can carry data at only about 2,400 bit/sec, because of its poor quality, to digital, said Paul

> Digital cellular should boost individ uals' wiretess wide-area network se cess to 100K bit/sec. per user - speed

red local-area networks. Also, the Federal Communica Commission has approved a technol-ogy called CellularVision, patented by e company of the same name in Freehold, N.J. It can reportedly run video-

high-bandwidth applications at 1G bit/sec. speeds - potentially rivaling lber opties [CW, Dec. 21, 1992].

PCMCIA standard not in the bag

Competitive systems manufacturers holding up process

By Christopher Lindquist and Michael Pitzgerald specification 2.01, the latest version of the stan

IBM sees this as enough of a problem that it While the Personal Computer Memory Card In-ternational Association (PCMCIA) appears to oed ThinkPad Proven, a program that rtifles PC cards for use in its syste

be marching inexorably toward a common, in-The risk we're running into now is this stuff The risk we're running into now is this stuff is going to start appearing in the stores, and there could be a consumer backlash," said Andrew Prophet, president of AP Research in Capertino, Calif. a market research firm specializing in the PCMCIA and semiconductor teroperable standard for PC cards, the group may encounter difficulties trying to keep its

Apple Computer, inc.'s Newton, but this may be

Various schemes are under consis ding a means of marking cards and systems in such a way that users would be able to pet working combinations, much as they can with automated teller machine cards today Creating software drivers that would allow in ble cards and systems to work together

This will become more of an issue as non-la-tel devices that could use PCMCIA — for examie, personal digital assistants such as the Newton and the AT&T EO Personal Communicator-become more widespread. While all will be PCMCIA-compliant, cards for one system ay not work in the PCMCIA slot of another.

Better mobile network infrastructure needed

By Michael Fitzgerald and Joanie M. Wexler

DALLAS

Data communications issues remain major stambling blocks for notebook users, according to attendees at Data-quest, Inc.'s Mobile Computing Forum

re last week. For example, during a conference session, Sheldon Lanbe, Price Water use's national director of information technology, lambasted vendors for megting a communications in-

trastructure - both wired and wireless - that shows a lack of foresight. "Today's systems are aimed at et, fast transactions; they're not od for big files," Laube said. Users need the same access to date.

e road as they do from their desktops, Laube said, and with vendors talking about features such as voice annotation and video, the data infraecture is not yet adequate. owever, several initiatives are under way to address some of these issues. In the wireless world, for exampie, the next generation of cellular

Nikolich, a senior engineer at Racai Datacom, Inc. and wireless standards

comparable to what asers end up with

conferencing, multimedia and other

in addition, vendors such as Sim Ware, Inc. offer compression software

and processing techniques for laptor to reduce the volume of data going on over WANs, said Charles Nahabedian vice president of corporate develo-ment at wireless carrier RAM Mobi Data in Woodbridge, N.J.

ot holding their breath

Several users agreed with Lau central points, and few said they were counting on wireless technology soon. For instance, at Energy Industries, a ivision of Holt Co. in Corpus Christi,

Texas, that services gas compressors. "there is no way we can outfit our field service technicians with notebooks under the current way of doing things," said David Stephens, Energy formation systems manager. Vendors acknowledged the co

nications issues. "People have got to play with this stuff for a while." William A. Frezza, director of market ing and husiness development at Eriesson GE Mobile Communications.

Inc. in Paramus, N.J. "If we try to solve problems before we bring the technolony to market, we don't know what the



No Fences. No Boundaries. No Limits. That's The Freedom C

The freedom to choose the best applications without worrving about hardware constraints.

The freedom to right-size your entire computing environment with the best mix of hardware platforms.

And the freedom to integrate and automate all your applications across the many proprietary, closed environments you face today it's all there inside the most compre-

ware platform including IBM, Digital, Hewlett-Packard,

hensive architecture ever developed: CA90s. The only architecture that supports every major hard-

onal, Inc. One Computer Associates Plaza, Islandia, NY 117

Apple, Fujitsu, Bull, Data General, Tandem and Hitachi. All the major operating systems: MVS, VSE, VM, VMS, UNIX, APPLE, WINDOWS, DOS and OS/2.

And the world's broadest range of integrated software solutions, covering systems management, information management and business applications.

If you're tired of being fenced in, call 1-800 CALL CAL for complete information on

The architecture that can set you free.

Quarterdeck recalls software

Quarterideck (Piccasts Sortware
Quarterideck (Piccasts Sortware
Quarterideck (Piccasts Sortware
100,000 copies of Quarterideck Expanded Memory
Manager ((SMM) 7 81 fix prohibera reported by early
users. QEMM 7.81 will be available soos and should
resolve complaints, particularly those involving interction with Microsoft Corp. 1 Double-Space olds conusion, that were discovered after the product had eady been sent to dealers.

Vireless speeds up

Advances in wireless networking debuted last week from Motorcie, inc. and AT&T Paradyne, Motorcia's Plax High Speed Paging Protocol, to be used over rariss, riga oped Paging Protocos, to se used over ris-dio-based paging networks, resperiedly belows trans-mission speed, data integrity and battery life while operating at 1,500, 3,200 and 6,400 bit/sec. AT&T Par-adyne's Enhanced Threegiput Cellular protocol is said to also address the throughput and reliability is-sues facing sobile computer overs fodow in the cellu-

SEC scrutinities Storage Tek Storage Technology Corp, sald it is being investigat-ed by the Securities and Exchange Commission on possible charges of insider trading and/or violations of federal discourse or reporting laws. The investiga-tion follows a clean action said fined earlier this year to be commissioned to the commission of the commission of the property of the commission of the commission of the commission of the property of the commission of the chunks of company stock just before the firm an-nounced delays of its leeberg disk array. Storage Tek said it intends to cooperate with the investigation.

IBM names strategy guru
IBM has named Bernard Puckett senior vice president of corporate strategy and development; he will
report to Chief Executive Officer Louis Gerstner Jr. A. 5-year iBMer, Puckett was most recently senior vice syear intere, recess was most recently includent vice seident of the Application Solutions line. Industry states of differed over whether this was a plum sant to show the existing raft of IRM excess that there uld still be career advancement within IRM or a signal of Gerstner's intent to reorganize some parts of

C price war casualties mount

P.L. pixex wifer Cassistations mount. There were eigen last week indicating that last year's price wars are continuing to exact a sold on the PC industry. While Groups Ball, contract (Zealth Data Sys-tems; bought a piece of Prakasar Ball Electronics, Inc., Compuded Competers Corp., Bird for bastry-cy Ball bought a 30° stable in Puckar Bell and said. Pockard Bell and See this bill a will contract the Pockard Bell and See this will be will be sold on the said. PCs — expected to be low-cost machines — to round out Zenith Data's product line. Packard Bell will resell enith Data's low-end notebooks. CompuAdd, mean-this declared Chapter 11 bankruptcy.

Vendors promote Unix standard A group of 33 vendors have joined to promote stan-dard application programming interfaces for storing

dard application programming interfaces for storing data under Unix. The Data Management Interfaces Oroup incindes IBM's AdSter peripherals business. Hitachi Computer Products, Inc. in Santa Clara, Calif., Auspex, Inc. in Houston and E-Systems, Inc.

HORT TAKES United Parcet Service, Inc. will build a \$55 million data center in Atlants to back op its pri-mary facility in Mahwah. N.J. . . . \$Com Corp. an-nounced record sales of \$167 million and record earngs per share of 40 cents for the quarter ended May

ODBC drivers lack power

By Michael Vizard

Vendors such as Microsoft Corp. are talking up the importance of Open Database Connectivity (ODBC) drivers for linking froottions to back-end SQL databases But industry analysts are warning information systems directors

> considerations going to make ODBC interfaces a secondary choice for developing client/server

ODBC. Micr implementation of the SQL standard from the SQL Access Group, was designed to give developers a common SQL interface that can be ap plied to multiple

nck-end databases. Earlier this mooth, Microsoft delivered Versioo 1.1 of its Access daase, which includes ODBC drivers for accessing data stored on SQL databases from Microsoft, Orsele Corn and Sybase Inc. ICW. June 71.

But industry analysts stressed that the performance trade-offs associated with the current ODBC elementation will push most developers into working with faster, existing proprietary interfaces for ng SQL databases

that's not going to perform well in production applications," assert-ed Richard Finkelstein, president of Performance Compu consulting firm in Chica

in fact, developers are al shying away from both ODBC and Boriand International, Inc.'s Inte-grated Database Application Pro-

til they see how widely they are accepted, said Noah Ross, director of technology at Cap Gemini USA, a systems integrator in New York

Finkelstein maintained that ODBC will never evolve into a real industry standard because it is a lowest common denominator inrface, which limits functionality. "Every time developers come up

against a limitation, they use escape clauses in ODBC to access au-

base native interfaces," he said. Finkelstein also noted that ODBC drivers do not support com-

For its part, Microsoft takes ex

ception to any suggestion that ODBC is a lowest common denomi-

"We're not telling people that there isn't any room for propri-ctary APIs, but there is no empiri-cal data that says ODBC is any ower than any other interface aid Kyle Geiger, ODBC geoeral anager at Microsoft.

In fact, developers at Xerox Corp. in Rochester, N.Y., are using ODBC to link Access to Oracle and IBM's DB2 database over Transon Control Protocol/Internet

That application, which cur-rently consists mainly of one-way queries, runs exceptionally well, id Doug Long, a senior program analyst at Xerox. ram more robust interactive ap-

dications, they may find oative in-erfaces offer richer choices. "A specific driver is going to be such faster than a standard drivor. Our tests bere show that ODBC is definitely much slower than the native drivers," concurred Swaroop Conjecvaram, manager of product marketing at Dharma Sys-

s, Inc. in Nashus, N.H. a routine DOS 6.0 issue and was surprised when on three separate calls, "Microsoft told me that they won't support DOS 6.0 if it's pre-loaded by the manufacturer." He was referred

to his manufacturer for support. Murphy's shop uses PCs from Compaq Computer Corp., Dell Compoter Corp. and AST Research, Inc. Microsoft winnowed Murphy out by naking for a serial symber found on rotal copies of its products. But this practice appears to be arbi-trary, Jurmana said he has been anked for a se-rial oumber, but despite not having one, re-

ceived support anyway. Microsoft said its policy has always been to refer users of OEM versions of Microsoft software to the hardware vendor. However, the pro-

cedures were not always in place to make sur-only retail customers were supported, which may be why a half-dozen users contacted said Microsoft has always supported them. "In general, we have been consistent about enforcing" the policy, said Kathy Plander, marketing manager in product support services at Microsoft. "Of course, in any given situation we try to be flexible to customer needs, such as

when laptop users may be traveling and do not have their serial number with them." Referring users to the manufacturers could become common. One well-placed source at a major hardware maker said Microsoft "has

een telling us in the last few mooths that it as to start cracking down on this."

MS-DOS support plan raises user questions

andChristopher Lindopist

Users who buy software bundled on their hard drives may be in for a surprise the next time they call Microsoft Corp.: The company ap-pears to be enforcing a 2-year-old policy that says it is responsible for supporting only its retail enstamers.

Last week, osers said the policy, if continued, ould spark an outcry. Microsoft and various bardware were agree that if a box comes bundled with DOS.

Windows or Microsoft applications prein-stalled, the hardware vendor, oot Microsoft, should handle support for it [CW, June 21]. Before Microsoft went retail with DOS 5.0, all DOS was sold with systems and was officially supported by OEMs. Let me stress that t have not experienced

this, but if it was true, we would have to sit down with Microsoft," said Olenn Jurmann, section manager of office technology at Baxter Healthcare Corp. in Deerfield, Ill.

But Douglas Murphy, director of MIS at Com-cast Corp., said be recently called Microsoft on

ANNOUNCING A MAJOR STEP FORWARD IN ENTERPRISE-WIDE COMPUTING.



THE RIGHTSIZING CHALLENGE

In theory exploiting the conomies of networked PCs while continging to extract value from idderlarger systems is relatively straightforward. In practice is in the Fore a start, no single whole can provide the optimal integrated software solution for managing information from the mainfame to the decktop. While distributed computing makes data readily accessable, it also accedenate the novemen of data around the enterprise magnifying the levid of data around the enterprise magnifying the levid of which worked to all can be a relationary solution.

MAKING IT Easier Today

Novell and Oracle own 65% of the networking software marks and 48% of the database market respectively. With our software we span the enterprise as no other company, or combination of companies, can for years, we have worked to ensure our products are companiely. Novel and the company of the product of th

of contact for support. In short, two technology

powerhouses operating as one accountable vendor.

PROVIDING A CLEAR

Making it as easy for you to leverage today's leading technology is only one part of our commitment. As your data and networking requirements explode. Oracle and Novell will continue to provide integrated, reliable, open, and sclaable solutions. This underscores the true value of our partnership-the power of two leaders working today to solve tomocrow's problems.

If you're involved in making decisions about your company's information systems, you should know more about this important development. Call 1-800-633-1071 Ext. 8127 for additional information on how this alliance will positively impact your business.



MNOVELL

D1993 Oracle Corporation. Oracle and Novell are registered tradonaries of their respective companies. OracleWare is a trademark of Oracle Corporation.

Network management systems connect

SunConnect and Novell partnership to provide centralized administration ording to Brad Hecht, a senior

By Elisabeth Horwitt

In a highly complementary alliance, Sun Microsystems, Inc. subsidiary SunConnect and Novell, Inc. have

agreed 'to interconnect heir respective network nanagement systems, Sun-Net Manager and NetWare

Manager to provide central administrators with an overview of the enterprise work, leaving NMS users tWare issues, Sun said.

The agreement puts Norell's huge NetWare instalion within reach of Sun-Net Manager, which needs the local-area network cliant/samme . manage

alyst at Gartner Group, Inc., a market earch firm in Stamford, Conn. dy SunNet Manager is the

dominant player in multivendor, Simple Network Management Protocolagement, an area that Novell is only just beginning to

Sun also brings to the party broad third-party petwork management applica-

tion support, which is still comparatively limited for the newer NMS.

The NMS connection will address the needs of users who had been using SunNet Manager to manage "the hig [Unix] boxes and routers and letting the PCs take

"We use

SunNet

Manager

hecause

we've got a

cheap site license, not

because

we're

particularly

fond of it."

- Kevin Oberman

win. "They said they wanted to see what those [PC] guys are doing to make it part sites, Baldwin said. of the overall networking

The initial offering, due out in first-quarter 1994, will allow the two systems to share information for managing the NetWare environ For example, NMS will allow SunNet Manager to access

detailed information about NetWare servers, includir print queues and print jobs. LAN subsystems, NetWare Loadable Modules, memore CPU and disk use and soft



Future interoperability will include an autodiscovery tool that reportedly will allow a SunNet Manager administrator such as tolecommunications devices and services, under the SunNet Manager umcare of themselves," said to map out and diagram topology infor-Sun spokesman Stan Raldmation about NetWare servers and at-

"People tend to have Unix, Sun and Novell in riwined already" at corporate

He added, "SunNet Manager will provide a central view but also manage No-

vell servers pretty thoroughly"via NMS. The agreem nts the first solid piece of

work management archi-tecture, which will define bow multivendor network apagement systems can cooperatively manage enterorise network installa-Sun plans to enter sh

lar partnerships with oth network management ven me, in order to bring addition



ment platforms, according to consulting firm Kaptronix, Inc. in Haworth, N.J. Last week Kaptronix published a re-port comparing Sushet Manager, NetView/8008 and Open-View, based on an in-bouse evaluation of the three products

me story this page). Introduced in the late 1980s, SunNet Manager has long ployed a dominant market position as a de-

opment platform that third parties could use for their own network management sys-tems. However, Sun has fallen far behind ri-vals HP and IBM when it comes to targeting mer companies that are in the process of king their enterprise network me at system, analysts and neers said

IBM and HP have been aggressively fitting their products with graphics-based fleip tools, applications and automatic utilities hat screen users from the complexities of Simple Network Management Protocol (SNMP). These tools make it a lot easier to switch between the different applications and views needed to manage a network, according to Atul Kapoor, Kaptronix presi-

A lack of such features has made SonNet Manager awkward and frustrating to use, Lawrence Livermore National Laboratory ling to Kaptronix. Users agreed: "It has an agty excuse of a human interfa-

wery sparse, and the graphics are not all that useful," said John Scoggin, supervisor of network opera-tions at Delmarva Power & Light Co. in Newark, Del., which bought a copy of the product to manage Sun wo That's one reason we don't use it [more widely]. It's not

the easiest thing to install, either."
"We use SunNet Manager because we've got a cheap site liceuse [with a large Sun workstation installation], not because we've particularly foud of it," said Kevin Oberman, a network manager in the engineering department at Univer-sity of California Lawrence Livermore National Laboratory

in Livermore, Calif. "It does a job reasonably well in an awk-

The list price for SunNet Manager is \$3,995, while Open-View Network Node Manager and NetView/9000 both cost approximately \$15,500 ing out this summer will addres The eah "many of the case-of-use features" that the Kaptronix re-

port identifies as missing from SunNet Manager, Borolch said. The enhancements will not change SunNet Manager's price, he added Several users expressed a strong preference for Motif

over SunNet Manager's current proprictary graphical user interface, OpenLook Sun will deliver Motif support in the second half of next year, Borcich said.

Beyond the user-friendly features expoeted out this summer, Sun is preparing the next generation of SunNet Manager, a perative architecture in which "no singie platform [from any one vendor] will do everything," Sun spokesman Stan Baldwin

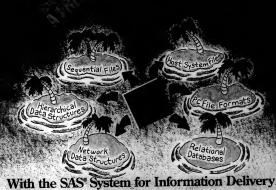
Taking a partner Sun made its first move in that directi last week with the announcement that it will partner with Novell, Inc. to develop interoperability across SunNet Manager and Novell's NetWare Management System (see

The architecture will support industry application programming interfaces such as the X/Open Management Protocol and provide services for coordinating resource anagement and information exch across different management domains, ac

This strategy, on the face of it, fits well with a network anagement architecture that Ontario Hydro has been developing prior to actually shopping for products, according to Simon Chan, a telecommunications engineer at the To-

ronto-based utility. "Our criteria is openness and the ability to integrate not just vertically across multivendor element management systems but horizontally between management fun and domains," Chan said





Now you can put all your remote "islands" of information within easy reach of your organization's decision makers. With the SAS System, data-regardless of type, file structure, or hardware platform—becomes a generalized and available resource.

You can provide transparent access to relational databases such as DB2°, ORACLE°, Rdb/VMS°, and SYBASE*...PC files such as dBASE*, Lotus* .DIF, and OS/2* Extended Services Database Manager...and a variety of other file types. The SAS System invokes the power of Structured Query Language (SQL) for data access and display.

The SAS System's unified approach to data helps you hold down costs (why maintain unnecessary duplicate files?) while also reducing your training and support burden (since every department shares the same path to data).

Even more important than data access is the ability to turn raw facts into real information. Using the SAS System, decision makers at every level of your enterprise can exploit the power of the world's leading information delivery system. Choose integrated applications for EIS,

forecasting, project management, corporate reporting, quality improvement, electronic spreadsheets, and hundreds of other tasks.

Just Give Us a Call to Reach Your Remote

Call-us today at our strategor. for more details about our strategy for enterprise-wide data integration ... plus a free video introduction to the SAS System for Information Delivery. We'll also tell you how you can evaluate the SAS System free for 30 days.

Drive Cary, NC 27513 77-8200 Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc. The following are also registered trademarks: DR2 and OS/2 (BM Corp.), ORACLE, (Oracle Corp.), STEASE Options, inc.), (ERASE (Julinos-Tare), and Little (Julino Development Corp.), in the following are trademarks: Bith (VMS) (ligital Equipment Corp.) and Distrated Services (BM Corp.), Capyright © 1902 by SAS Institute Inc.

Win32 web

CONTINUED FROM PAGE 1

and security and symmetrical multipro-cessing, that are included in the full Win82 kit.

But as Windows developers begin to master the basics of 32-bit programming, many of them are now looking at whether they should move beyond Win32s to the

full Win32 kit or opt to program to a sep-arate kit, referred to as Win32c. 4.0 and are becoming much braver in terms of working with the Win32 kits," This latter kit will allow applications

rms, a 32-bit preemptive multitaskagenvironment known as Chicago. In contrast, the full Win32 kit allows applications to take full advantage of the tures in both Intel and RISC platforms, the company said.

said Noah Ross, director of technology at to run on Microsoft's forthcoming Win-dows 4.0 operating system for Intel Corp. Cap Gemini USA, a New York systems in-

Stability needed

"Developers are climbing the walls trying to figure out what API to write to. Microsoft needs to stabilize the target platforms; otherwise; they are three these people's business," added John "People are looking toward Windows

Donovan, an industry analyst at Work-Group Technologies, Inc. in Nashna, N.H. According to Microsoft, Win32c is the first step toward 32-bit computing that

gives applications access to a flat memo-ry model. And although the Chicago prolect is still evolving, most developers using Win32s on intel platforms should look to Chicago as their growth path, said Brad Struss, manager of Win32 develop-er relations at Microsoft.

Meanwhile, Struss said developers working with the full, Win32 kit on Intel and RISC systems should probably look to Mi-WINDOWS crosoft's Cairo project, an object-orient-

ed file system due in 1995, as their growth path. For example, IMRS, Inc., which devel-ops financial software, used the Win82 kit to develop its 32-bit appli which will run on both Intel and RISC platforms without taking advantage of the multithreading capabilities of the

RISC platforms. Because IMRS will focus more on add ing new features to its software during the next year, IMRS will probably move to support the features set in Win32c rather than write to the full Win32 application programming interface (API), ac-cording to Dave Morchead, director of research at Stamford, Conn.-based IMRS.

"Which kit you choose depends a lot on bow much you want to take advantage of features like multithreading on platforms other than Intel. You just have to figure out how much extra performance multithreading gets you on some platrms and the importance of the security features. But it's about the same are of work with either API," Morebead said.

Different targets In general, Struss said the major differ

ences between NT, which requires at least 16M bytes of memory, and Chicago, which is expected to require only 8M bytes of memory, is that the latter project is aimed solely at Intel pistforms, while NT is a portable offering that has higher levels of security and multithreading ca-

In addition, NT will eventually have a higher level of peer-to-peer networking services as part of the migration to Cairo.

he added [CW, May 31]. As a result, developers such as Lot

Development Corp. said they see Win32s as a kit targeted at client applications, while the full Win32 kit targets NT server-and RISC workstation-class applica-"We see Chicago as being sort of an NT-

lite that will fit on the desktop, while Cairo is kind of an NT2," Morehead added.

And the time frame for when develop ers want to deploy those applications may ultimately decide which Win32 kit they choose.

"If you want to deploy it in 1993, you'll use Win32c. If it's 1994, you can use the full Win32 kit for NT; and If it's 1985, you can think about Chicago," said David Cearley, a vice president at Meta Group, Inc., a Stamford, Conn.-based consulting



If you can do it on a PC you can do it in COBOL.

Do you believe PC-based business. applications can't be done without



Think again. If you have

COBOL experience (even on the host) you can immediately put those skills to work creating the most demanding PC applications with the latest graphical user interfaces; applications with access to databases and communi-

cations technology, optimized for today's hottest PC hardware architectures.

Whether you are programming for DOS, Windows," or the latest 32-bit operating systems, the



PC Programming Solution offers low-level access to API and DLL support, or highlevel functions

controlling GUI, database and networking.

The Micro Focus PC Programming Solution combines state-of-the-art programming tools and



utilities with the industry's most popular PC-based COBOL compiler. The result is a development environment that lets you produce modern, maintainable business applications on time and on budget.

To put the Micro Focus PC Programming



Solution to work for you today call 800-872-6265. Discover how Micro Focus delivers "A Better Way of Programming.""

eer-to-oeer networking

IBM releases APPN control

BESEASCHTBIANGLEPASE, N.C.

An abrupt passing of the gavel at an IBM developers' con-ference last week unabackled third parties from IBM's long-

standing dictatorship over key notworking technology.
The unexpected industry milestone — brought about by a third-party rebellion against IBM at its Advanced Peo-Peer Networking (APPN) implementors. Workshop here had many developers graning from our to our as they got peeks at new technology, received reasonable software it-censing terms and welcomed a democratic change of pace. IBM realized that if APPN— its emerging technology ap-

proach to distributed networking— is to hold its own against Transmission Control Protocol/internet Protocol (TCP/IP) as a viable next-generation backbone, "it will have to open its doors to other vendors' input," said Terre

to open its doors to other vendors' input," and Terrence Bishop, vice president of marketing at Inseason, Inc., a Boulder, Colo, builder of BM Systems Network Architecture (SNA) ostiware for Tanden Computers, Inc., systems. The epiphany means users will eventually get technology no longer chained to IBM's development pace and view of the world, a situation that should result in an accoleration of interoperable products, developers said.

ered around the future of Data Link Switching (DLS), an IBM-generated scheme for Data Land Switching (DAS), an interpretated section for routing SNA traffic by encapsulating it in IP packets. On-ference attendees witnessed so mach contention between IBM and router bigwig Cisco Systems, inc., which tests its own encapsulation technique, that they reportedly got fed up and ousted both IBM and Cisco from leading the DLS deend, they elected a "neutral" third-party consultant,

tute, to chair a DLS Special Interest Group, a democratic first at an IBM developer's conference. Heradon Wells set up seven working groups focused on DLS issues such as constion control and Ethernet interoperability

The DLS committee agreed to work toward a comm ethod for running SNA over IP "so different ronters can communicate," said Alan K. Bartky, manager of technole at Sync Research, Inc. in Irvine, Calif. Bartky said he was concerned going into the "initially tension-ridden" more about whether his company's wide- to local-area network adaption devices would interoperate with IBM's 6611 router, but he said his worries were alleviated.

Bartky also predicted that Advanced Peer-to-Peer Interne working, Cisco's rival to APPN, and DLS will "eventually

Other signs of APPN progress included the following: IBM opened up its APPN Network Node interoperability testing service to any vendor with an APPN implementation. Previously, only companies that licensed APPN Network Node source code from IBM (for \$400,000) could earn IBM's

interoperability seal of approval for their products.

* IBM agreed to become APPN End Node software, in the right to use all APPN patents, for a onetime \$5,000 fee. "This is very fair and means nothing now stands in our way with end node development," said Miles Ulrich, SNA techogy center manager at Wall Data, Inc., an SNA gateway maker in Redmond. Wash. *IBM revealed snapshots of its High-Performance Routing and Discovery architectures, enhancements that add dy-

namic functions to APPN. *A group met to foster progress for a technology that would enable a 3270 terminal to attach to an APPN network.

Coming attractions

Cisco offers low-end links

anies looking to blend ever-smaller site Companies source to their ever-animaler size into their corporate internetworks guined more options at palatable price points from router leader Claco Systems, inc. has week. In a competitive response to 3Com Corp.'s Boundary Routing architecture — a tow-cost. bridge-like technology announced last December that many companies are eyeing for their

network peripheries (see story at right) — Cis-co introduced an ultra low-cod platform, called

Most low-end routers on the market today besin in the \$5,000 price range Cisco also enhanced existing remote router odels and added overarching administration and management tools, which include the ability to centrally install far-flung routers. The reliouts look to be a "good fit for our

small sites — and we have a lot — mainly be-cause of cost," said Reuben Lantto, director of international telecommunications at Cargill, Inc., a Cisco shop in Minneapolis "The centralized installation will be very

useful when deploying a big network and you're short on people and time," he said.

The Cisco 2000 fixed-configuration router runs nited protocol set: Internet Protocol, Novell, Ing. IPX, Apple Computer, Inc. AppleTalk, X.25, bridging, frame relay and bandwidth-conse

The wide-area links, plus a basic-rate inteued Services Digital Network interface added to the larger Cisco 3000, aim to let users choose the lowest cost telecomm service in a given part of the world, said David

son, Cisco product ms. "The cheaper the routers are, the less we we to charge for our services," said the telemunications manager at a Canadian govent agency that provides network ser-

British Columbia Systems Corp. rums about 200 Cisco routers, said Al Tenadale. He said tax-payers pay for network services to hospitals, ols and government ministries. "We're pushing Cisco for something under \$1,000."

"There's clearly a lot of interest in the super-low end," said Fred McClimans, an analyst at Gartner Group, Inc. in Standord, Conn. "And Cisco has decided the market is ripe for anothor price cut and has changed the rules."

McClimans predicted that with low-end rosters priced just a few hundred dollars more than bridges, users will opt for routing to gain band-

width management capabilities

Bandwidth management, please

The invisible hand of competition may be easting a Hatfield-and-McCoy-like aura around Cisco and 3Com. But in the true spirit of capitalism, users will benefit.

ownership by 50% by enhancing its router line this year with mor bandwidth management capabilities and additional Boundary Router wide-area network interfaces. Boundary Routing is a low and SCom router architecture that simplifies and reduces the cost of remote routing where a given afte connects to just one other site. James I. Hydra, director for feetwork strength years after James I. Hydra, director for feetwork strategy recearch at Por-roster Research, Inc. to Cembridge, Masse, said that in contrast, Claco's announcement "is their answer to Boundary Mouting and it's not a very creative one."

She said more would have benefited by more bandwidth mement capabilities, akin to 2Com's enhancements, in Circo's



For your personal copy,



call 1-800-8-SYBASE.

Show spotlights emerging wares

Sights to include WordPerfect's Amber, HP's Vectra VL, Lotus' Improv

By Michael Vinard and Michael Fitzgerald

This week's PC Expo will offer attendees a walking tour of

eeding-edge technologies. WordPorfect Corp., for example, will showcase WordPorfect applications working on top of the Amber technology that is being developed by Apple Computer, inc. and Novell, Inc. Amber is a set of facilities similar to Microsoft Corp.'s Object Linking and Embedding protocol for Win-dows that was designed to link applications across Macin-tosh, Novell NetWare and Unix environments. In addition,

ind international, inc. will demonstrate development s that work across the Amber architecture. canwhile, Hewlett-Packard Co. will announce its entry nto the low-end PC market with the Vectra VL line. The line SSSX, 33-MHz 486DX or 32/86-MHz DX2 processors, and

start at less than \$1,250. The day when you have an int our PC may come sooner than you think. IBM will demonstrate prototypes of the WordPerfect word processing software and Lotus Development Corp.'s 1-2-3 spreadshoot run ware and Lotus precopined corp. a 1-2-3 spreammen rea-ning on OS/2 equipped with speech-recognition software. IBM will also ship speech-recognition developer kits for Windows in 30 days, according to Elson Sherwin, IBM man-

ager of speech recognition.

PC Expo attendess will also witness the first point release of Lotus' improv spreadsheet, which thus far has 200,000 liceases delivered. Release 2.1 includes support for the WK4

file format found in 1-2-3 Version 4.0, a database access driv-or from Pioneer Software, inc., support for the Application Field Exchange that will link improve to the Notes groupware offering and a network-ready installation procedure. Inprov is available for \$199 to anyone who already has spread-

Unern looking for a way to upgrade their 396 systems to 486 systems without replacing the motherboard will likely be glad to see Cyrix Cerp.'s CX48DR² chip upgrade. The chip lets users with 15-, 20- or 25-MHz 395DX systems apgrade to 486-chas power by just replacing a chip. Cyrix will make a clock-doubled version of each speed, priced at \$349, \$309 and \$499. The 18/32-MHz and 20/40-MHz chips are available w, while the 25/50 will ship in September

In addition, the pen may prove mightier than the key-ard after all. Interite Corp. in San Mates, Calif., plans to inch pen-based technology that will allow its MP 100 Writing Pad to interface with off-the-shelf Windows and DOS ap-

Tonbiba America Information Systems, Inc. cou to buck portable trends. It is expected this week to relea its T6800C luggables, which are larger and weigh more than their predecessors. Still, the trade-off could be worth it for users because the systems include room for two soc ts and have a 510M-byte hard drive, a 10.4-in. color screen, a built-in 5%-in. double-speed CD-ROM drive and a MediaShare Mambo digital video interactive card. Pricing ranges from \$7,690 to \$9,490 for the three models, which range from 17.1 to 19.3 pounds.



IS to gain application control

CONTINUED FROM PAGE 1

s, or agents, that can be deploy ross multiple Microsoft applications naing on Windows and Macintosh

Also, the common macro is hich will be included in forthcor

ke it easier for corpo te developers to intee custom applicas built using Visual poed Microsoft pack

We need to incorp te Word and Excel into er applications, which sy requires low-level gramming," said Bob unington, project der for the computer an interface for the id prototyping labora-

a Visual Basic macro. ce Co. in Sunnyvale, The Visual Basic offshoot is based on the remain many common is based on technology created under Microsoft's Object Basic project. The Inter technol-ogy will form the foundation of future it-erations of the Visual Basic language for 32-bit platforms, according to Robert

specific

Bach, group product manager for M noft's Office. However, only the next major releases Exceet and Project will support the com-ton macro language. Other Microsoft

s such as Word will add sunort for the common macro language in sture releases. Meantime, Bach said the mon macro language will be able to call Excel-, Word- and other applicationrific macros as subroutines embed-

ded in a Visual Basic macro. Microsoft is expec to use this technology to create a series of tem-The common plates for automating macro cific tasks. language will

One of those tasks will be a budgeting template that will collect and conbe able to call solidate data from a vaapplicationriety of apreadabeets. according to Matt Cain. macros as program director for desktop computing strategies at Meta

subroutines Group, Inc. in Westport, embedded in But while Microsoft is likely to win kudos from

IS shops for better integrating its applications, raze vendors are som what miffed that Microsoft does not plan to offer this technology to them for inclusion with their software.

Visual Basic's "Applications Edition has been optimized to work with our apnations. It is unique to our applicaons," Bach said. As a result, third-party appl will have to rely on OLE to integrate their cations with Microsoft applica-

"So long as you expose your applications as an OLE container, you'll be able to work with Visual Basie or any other macro language," said Alex Morrow, vice presi deni of cross-architecture platforms at Later Development Corp. (see story page

Bul some develop ers said they were led to believe that Microsoft planned to devel-

language for all applications and are grousing that Microsoft has decided to leector for PC software at Internal

Charles and - 0

Mille Constan yes (26 in Shrt depress - 366 Shris Chrt depress - 8

verage its Windows work into a competi "The people who can benefit from an

Basic to make their objects more intelli-gent," said Brent Williams, program di-23-bit plans face compatibility issues

crosoft plans to bring its Visual Ba ogramming language into its 32-bit en-conments but conceded there will be some compatibility issues that will need to be worked out. Among them is the fact that developers will not be able to call Dynamic Link Libraries across 16- and 32-

open standard are small [independent

software vendors] that could use Visu

Data Corp. In Framingham, Mass.
"We knew that Microsoft wasn't goi to publish an API for Visual Basic, but that's because we asked them. They weren't trying to hide it, but they weren't screaming it from the rooftops either," said Dave Morehead, director of re-search at IMRS, Inc., a Stamford, Conn.,

VI TRIDITY an / har

developer of financial software. But it will still be a number of years be fore this lack of support for third-party plications becomes a problem, Wil-ms said. Most sites will continue to work with their existing macro languages, with the transition to Microsoft's common macro language taking place during the next two years.

"We don't really have a need to into grate applications other than Microsoft's with our applications at this time. But I can see how it might be a problem in the

IBM to unwrap PC-DOS 6.1, Pen for OS/2 software

By Christopher Lindquist NEW YORK

IBM is set to announce its version of DOS 6.0 as well as several multimedia tools and a pen addition for OS/2 this week at PC Expo.

PC-DOS 6.1 will come complete with what IBM calls "full-function" ntilities. compared with those found in Microsoft Corp.'s MS-DOS 6.0. IBM's additions include an antivirus package, a complete backup package that supports both tape and disk drives, Central Point Software. Inc.'s RAMBoost memory optimizer and an editor that supports multip

While the latest version of PC-DOS was originally stated to contain data compression, Walter Casey, director of marketing, said IBM has decided to perform more testing before releasing a version of PC-DOS with AddStor, Inc.'s SuperStor compression package later this sum Purchasers of the current release of PC-DOS will find a coupon in the box offering them a free upgrade.

PCMCIA support
The new PC-DOS will also directly sup port Personal Computer Memory Card International Association 2.0 and have elementary pen functionality that will al-

> Alternative styles

hile Microsoft is pushing Visual Basic as its common macro language, both Lotus and Borland tional. Inc. are pursuing al-Lotus is in the proc

Script, a derivative of the Baever. Lotus intends to enable as Script macros to be invoked on Windows, Unix, DOS and Macintosh pistforms, according to Alex Morrow, Lotus' vice president

oss platform architecture. The first iteration of Lotus Script is in Lotus' Improv for Windows

n macro language defeats the se of optimizing certain tools e applications, Instead nd plans to increase the level der the Borland Object Component

Both companies said a key com-opent of their integration strate-ies with other vendors is to make er applications comply with Mi-soft's OLE Version 2.0.

on some hardware as well as in a retail package for purchase by end users. OS/2 will also get some pen support. Pen for OS/2 will be available as an add-on for OS/2 2.1 and will include handwriting recognition and a development envi-

ronment for pen applications.

IBM will also unveil several "Ultimeats for OS/2, including Ultimedia Builder, a multimedia on development tool; Ultimedia Perfect Image, an image-editing package; and Ultimedia WorkPlace. s to images to allow sorting and carching in a database. All three products are due next me

NorkPlace and \$175 for Perfect Is As a promotional offer, Builder and Per-fect Image will be bundled for \$99, or WorkPlace alone will sell for \$69. Pricing for PC-DOS 6.1 and Pen for OS/2 was not available at press time.



Mith Automatic Backup Recovery (ABR*):

We you can identify inactive data and automatically and immediately results in data evitwin requested by a TSO user rchive it in co

Your choice. You can either keep buying expensive DASD or put ABR in constrait of your DASD.

3380-K 173095 72,44%

LIMNOVATIO DATA PROCESSING

CORPORATE HEADQUARTERS: 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300 EUROPEAN FRANCE GERMANY NETHERLANDS UNITED KINGDOM NORDIC COUNTR
OFFICES: 01-47-69-15-15 089-439-2053 036-534-1660 081-905-1286 +31-36-534-1680

Novell development framework to debut sill, Inc. is expected today to lay out the details for Mare, an object-oriented application developpWare, an object-oriented application develop-nt environment that will run on top of NetWare. The architecture is expected to incorporate technology from Hyperdeck Corp., Software Transformation, inc. and Serius Corp. — three recent Novell acquisitions that specialize in cross-platform application de-velopment tools [CW, June 14]. The aim, according to stry sources, is to make it simpler to develop ap-tions that make use of NetWare services in an en-

Traders sign up for network

nited wary of interference

United Airlines last week became the latest carrier to limit use of personal electronic devices—including PCs—during takeoffs and landings. United Airlines said its policy, which gues into effect Thursday, is a said its policy, which gues into effect Thursday, is a recautionary measure designed "to address the pos-ibility of such devices causing electromagnetic interference with cockpit navigation or con

Aultimedia for the masses

Raietde Labe, inc. made a spissh at last week's Digi-tal World trade show with the long-awaited navelling of ScriptX, a developer's tool for crafting a single mul-timedia title that can work on devices ranging from desktop computers to consumer electronics prod-ucts. The Mountain View, Calif.-baned company also introduced a new developer's program to encourage the creation of ScriptX products.

CSC division suspended from fed bids

C.S. CHYSION ASSIPPRIVED THOSE PROCESSORS OF THE COMPANY OF THE SECTION OF THE SE arded in 1990. The suspension does not al

Net management standard touted The Distributed Support Information Standards Group last week announced the availability of an in-tial specification for defining systems management information, including configurations, faults and per-

SHORT TARES Ball Communications Research has announced the successful circl of a milliographic state of the successful circl of a milliographic state of the successful circle of a milliographic state of the successful circle of the successful cir

Price options swamp users

At the contracting stage, however, talk is outpacing any action

and Johanna Ambrosio

Users who begged their software vendors for greater pricing flexi-bility and got it are finding out that having a basketful of options is no

IBM, Legent Corp. and Computer es Internstional, Inc., have caved in to users' demands for more pricing options and contractual terms [CW, May 24], this

diversity has spawned confusion Users are awamped by more licensing-related paperwork and decision-making than over before. Many said they are besieged with too many potentiat players, platforms and pricing alternatives to be sure they are making the best deals or even understand the deals

they are making w time-consuming is it? "A third of the paperwork going through my desk right now frelates to] contractual issuee," sald John Stevenson, vice president of MIS at Dallas-based Dr Pepper

Co/The Seven-Up Co. And if a sudden barrage of pricing models — such as user-based, usage-based, client-based, enterprisewide and a raft of combinaons - are rolling out at too beetic a pace, a widely acknowledged new spirit of fairness and quest for clarity in the contracting process is still at the stage where talk outes action, according to many

estry observers. These issues were brought to tight at last week's Information Technology Association of Ameri-ca-sponsored electronic town meeting on software licensing and subsequent Computerworld in-

The new software pricing diver sity "has put on us a burden of analysis," noted Robert Rubin, vice president of information services at Philadelphia-based Elf Atthem North America, Inc. Nor are all the announced options even available, he added. "The new mechanisms some vendors are touting bave not gotten down to the field reps."

State of confusion Companies transitioning from

host-oriented to distributed com puting are also confused by the mind-boggling array of licensing options. Buffsio, N.Y.-based Amer-ican Steamship Co. is in the market for help deak and inventory tracking management software to run on its PC local-area network. Business systems and telecom-

ue said he likes the product he is ing contracts down to plain En-looking at, but licensing it is prov-ing an embarrassment of riches. with the product of the contracts of the contract of the contracts of the contracts of the contract of the contracts of the contract of the "I had to call the vendor and go through the price sheet line by line

so they could explain to me what I need now and what later," Gharino said. "They have six different estegories of how to price this stuff out. One was 'unlimited user environment.' Another was '250-us environment or clients,' but they

Elf Atochem's Robert Robin: Soft-

ware pricing has his com feeting burden of analysis don't mean the actual users on the

system." Part of the 20-minute phone call was spent nailing down the vendor's definition of "client" and "user," he said. Some aspects of the contracting process are distinctly improvin seld Barry D. Weiss, a partner in the Chicago-based law firm Gor-don & Glickson. Inspired by IBM's efforts to boil its software licens-

Take five

software contracts to make them easier to read, to enable business-men to tailor them without a team of lawyers." On the other hand, he said he sees vendors solicità lawyers' input on the front end of the contracting process, harness-ing legal means to productive ends such as creating "contracting us-

Contracts are not just gett clearer—they are getting shorter Legent said Executive Vice Presi est Bill Drummey keeps its contracts to a single page

etter attitude

And parties ou all sides reported a clear change in the attitude users and vendors alike are bringing into contract pegotiations these days. "Clients realize that we've been creative in our approach to their pricing requests, and they appreciate it," said CA Executive Vice President Arnold Mazur.

But few are ready to decree the sing issue as out of the woods. "I'm still skeptical about many of the agreements when you sit down and purse them out," said Harry Glasspiegel, a partner in the Washington, D.C., law firm Shaw Pittman, Potts & Trowbridge, "Do they really protect the user? I've seen some vendors drafting more bert uner-friendly contracts. they're in the minority. Software contracting is still a 'cavnat emp-tor' situation."





Borland's InterBase

Seven reasons to get the OLCP edge

1. OLCP vs. OLTP

Borland's InterBase" is the first highperformance relational database server to satisfy your real-world computing demands. That's the benefit of On-Line Complex Processing (OLCP). InterBase's OLCP accelerates throughput for short, OLTP-type transactions, and provides outstanding support for longer, data-intensive analytic transactions using distributed and complex data.

2. Multigenerational architecture

InterBase outperforms all other databases in your real-world applications. Its unique multigenerational architecture results in the fastest response times in mixed read/write situations. And writers aren't locked out by readers.

3. Two-phase commit equals integrity for distributed data

InterBase's unique "peer-to-peer" architecture dramatically improves network performance. Frequently used data can be stored locally, while maintaining access to all data anywhere on the network. And automatic two-phase commit ensures data integrity by protecting distributed data from dublication, loss, and concurrency problems.

4. Multidimensional arrays for high-performance read/write

InterBase's multidimensional arrays store and retrieve data I 0 to 40 times faster than traditional rows-and-columns formats. Plus, indexed arrays make it far easier for developers to build and maintain applications.

5. BLOb filters make it easy to use multimedia data

InterBase sets the standard for support of multimedia data or BLObs* (Binary Large Objects). Any length and type of data can be stored—text, graphics, sound, video, even raw data from instruments. And special BLOb* filters let you compress and translate data, making InterBase the only database for handling complex data.

6. Easy code generation and maintenance

No one gives you better tools for maintaining data integrity and monitoring critical data. Modular, sequenceable triggers are ideal for enforcing referential integrity and other business rules. Event altertes prompt real-time notification when data changes, while minimizing network traffic and use of system resources. It all adds up to superior database performance

7. The power of Borland is behind interBase

Your investment in InterBase is backed by Borland International, Inc., the company that is #1 in relational database technology and #1 in customer satisfaction.



Event Alert!

Don't miss the Borland InterBase seminar coming soon. Fill in and return the attached response card today! Or, for more information on InterBase and seminar registration,

call now!

1-800-245-7367 or call (408) 431-5429

BORLAND

The Leader in Object-Oriented Programming

Now, it couldn't be easier to bring the IBM AS/400," the midrange computer of choice, to the desktop system of your choice.

Introducing the IBM AS/400 Client Series," client/server software for end users and application developers. Whether you're running seven client PCs, or seven hundred, making the move to client/server computing is easy. Because

the software is already preloaded and pre-

configured to your ecifications when you receive the AS/400 And if you're one of the 200,000

to whom AS/400s have already been shipped, you can get a single package of software that loads right into your system. So you can concentrate on your job, not

on your computer. If you're running OS/2;

Windows, Apple's System 7,

with a mouse. And ShowCase™ VISTA, which

lets you query the AS/400's database and view the results graphically. Plus Personal AS for decision support.

If you're a developer, your job will

be easier, too. You'll have popular tools, including Progress/400," SQL Windows," and Synon/CSG. There's also ENVY/400° for object-oriented development, and TRACK for Executive Information Support, all helping you develop and run missioncritical applications from your desktop.

or even good old DOS, your job will be easier. You'll be able to take advantage of programs such as Rumba/400 and SNA-ps 5250, which let you operate your business applications

er you're working in OS/2, Windows 3.1, Apple or DOS, AS/400 Clie



server

But you'll also get more than just the open advantages that come with client/server computing.

You'll also benefit from the advanced capabilities of the awardwithing AS(400, Every AS(400 comes with an integrated relational database, enhanced security, impressive networking capabilities and outstanding systems management. These features, combined

with over 20,000 proven commercial applications, have made the AS/400 the world's most popular midrange system. What's more, the AS/400 is very affordable, with



the lowest five-year cost of ownership in its class:

As always, you'll get superior IBM service and support, including a 24-hour hotline, to help keep the mission-critical applications your business depends on, up and running.



connections with AS/400 Client/Server.

It's for reasons like these that successful companies such as Mannington Carpets and Louis Dreyfus Energy have already chosen the

AS/400 for client/server applications.
For more details on the IBM AS/400 Client
Series, call 1 800 IBM-CALL, ext. 102B.

But hurry. You're losing valuable nanoseconds.
Success isn't complicated.

second.

operants of International Dusiness Machines Corporation. Windows is a registered tradement of Microsoft Inc. Apple, Dystem 7 and SHA-ps 5250 are tradement of formation of Corporation (Inc. Apple, Dystem 7 and SHA-ps 5250 are tradement of Section Corp. SHA-ps 5250 are tradement of Se

IRM

Spindler

CONTINUED FROM PAGE 1

not an aberration; it's the shape of thi to come," said Doug Kass, a principal analyst at The Viewpoint Group, a research rm in Santa Cruz, Calif. "I think we're styment and product levels

Some of the expensive R&D projects Sculley had forged as chief technologist — and pumped hundreds of millions of dollars along the way - could come under the ax. "Apple has many, many people working on projects that ain't coming to market in anyone's lifetime, and they're going to bail out," said Al Canton, a high-technology ultant and Apple specialist in Fair Oaks, Calif.

Some users said they fear that Apple's many technological initiatives may have ated the strength of its move to provide

Co. in Milwaukee. Analysts' predicti for what stays and what es as Spindler takes mmand include the wing PowerPC-ba

cintosh: Full steam ead. Motorola, Inc. i delivered the first chip earlier this year, as plans are still firmly in place to deliver a PowerPC-based Macintosh PC and server in the first

Lots of new

1517M

■ 522M

1 533M

E SAZN

2.2%

3.6%

K Re

postter of 1994 nore dozen costtu R&D projects Moving to the Pow erPC and keeping users interested along the way is absolutely the most critical battle for Apple to win," said Jean-Louis Gassee, former head of Apple Products Divi-

> Macintoshes: Good-bye. Users complain that Apple delivers too many models too fast without making clear what distinguishes one from the oth-

"They're confusing the bell out of everybody," said Mike Bailey, a systems integrator at Lockheed Missiles and Space Co. in Sunnyvale, Calif. They need to have fewer well-rounded products instead of dozens of machines aimed at specific

niche markets Sharp pruning could quickly add to the bottom line. "It's time to go pluck. ek, pluck and snip, snip, snip and make

the company more profitable in the pro-Gassee said. Early targets: the Mac iosh IIVX (which competes with the more lar Centris line) and the PowerBook BSC (a color model that uses the less adeed passive-matrix screen) Newton: Still a definite, but it has experi-

In the face of anticipated R&D cuts, Ap-ple is expected to continue teaming with other companies to expand its technology enced early rough spots. Initially scheduled for a June release, an early prototype

base (see story above right). Users said such cross-platform teamwork is crucial portedly had trouble in some groups. "These kinds of partnerships carry a lot of clout because they legitimize Apple in "Apple already had software burned into ROM and was ready to roll it out, but it was the eyes of a lot of IS folks," said Robert An-derson, a senior analyst at A. O. Smith disastrous," said one source familiar with Apple's plans



Up for grabs. Morris Unix System Lab ning Unix. Some said

Taradalsky, Enterms Division general manag-Apple is cooperating with IBM, Sun Microsystems, Inc., Hew-lett-Packard Co. and tories, Inc. to put the Macintosh user inter

this could blow up in

Why pay for a Mac-

Apple's face

-Unix initiatives:

intosh when you can get a much cheap Unix box with a Mac interface?" asked Tim Harmon, program director for desktop computing strategies at Meta Group, Inc., a consultancy in Westport, Conn. ▶Voice recognition: Uncertain. Apple's voice-recognition technology, code-named

Casper, is still a laboratory curiosity and might fall under Spindler's ax. ▶Cross-platform technology: A high priority. At a recent developer's conf Senior Vice President David Nagel an

nounced. "No major technology will be introduced from Apple that won't have crossplatform, pear-simultaneous releas

His words met with ringing apple from the 3,000 developers in atter and are a clear sign to Macintosh users that Apple is teaming up with the right people Some of the longer term and more con sumer-oriented projects of Apple's Person-al Interactive Electronics Division could take the hardest hit in the next year. Insiders said that while Apple remains emot ally committed to exploring new technologies, the here-and-now demi

running a profitable company mandate the reshulfling of priorities. Senior writer Michael Pitzgerald con tributed to this report.

AT&T reaches out to Apple

pofEQ.b

While EO A

"Look for a telecom tions link between a ad AT&T," such as re

the AT&T Easy-Link men That fits in with AT&Te

rategy to banically link its atomers to the world via anyLink, which is also nerwireless conn

-Joanse M. Wexler an Michael Pitagerald

A matter of time

"Apple is going in too many directions at once without focusing on the business needs of today," said Eric Jos, manager of

w British Columbia

on systems at BC Hydro in Burna-

m Cuperti ended over the CEO reins to his hands picked successor, Michael

eed that rumblings about the transition had been heard for sy had not been actively involved in Apple's day-to-day opera re then a year

rnings would be down sharply in the d layoffs [CW, June 14]. One Apple inside s really ready to go, and the board gave him y Wohl, president of Wohl Associates in

Betwixt and between



Will you get stuck with the wrong tool for the job?

Things could get pretty sticky if you buy the wrong business computer.

That's why I/S professionals like you are moving to the north tool for the job; workstations.

And when you compare workstations, you'll see that only one comes from a company completely dedicated to the needs of business.

Avil Workstotions

We're a new kind of workstation company. Our focus is delivering SPARC* systems built specifically to accelerate the productivity of business.

Which we're doing for hundreds of customers worldwide by providing quality American-mode products with business features. Plus Reedle configurations. And modular, upgradeable systems that protect your investment. And workstrations will also an your existing software.

Fract, we guarantee it. For proof, just look at our 90-day - ARC Compliant

money-back guarantee. As well as our Executive Membership in SPARC



And you can always count on solid support. Not just from Aud, but from our committed WAP portners too. So call 900-284-AVIL. Learn about the new workstolion company that's backed by Hyundia" and committed to really estiting your business cooking.

he business engine

Axil

WHY THE WORLD'S
BIGGEST DATABASE
COMPANY WANTS
CONTROL OF YOUR
BUSINESS.

WHY THE WORLD'S NUMBER 2 DATABASE COMPANY WANTS YOU TO KEEP IT.

You can turn your database into a formidable strategic asset. What you need are open systems, open software, and a database vendor who lets you design your database around your business. Instead of around their products.

That's why you should talk to Ingres. All INGRES database software runs on all open platforms. And we won't ever try to force-fit your business into our line of products.

Instead, Ingres offers a superior core of open database software, tools, and connectivity products. Products we've designed to work with applications from more than 1,000 other vendors.

The result? You have more options. You have control of your computing costs. And you have control of your business.

Would you like to control your own fate? We'll send you a detailed white paper from the Aberdeen Group, an independent industry analyst. It rells you what to look for when you evaluate open database software. Just call 1-800-4-INGRES.



IBM unwraps full-duplex Ethernet

ng to expand beyond its tradi-Continuing to expand beyond its trial-tional role as a provider of Tokon Ring products, IBM last week introduced the first "full-duplex" Ethernet adapter along with other new Ethernet, Token Ring and Fiber Distributed Data Inter-

Pull-duplex Ethernet is a fledgling technology that effectively doubles Ethernet's 10M bit/sec. transmission rate by allowing users to send and reve signals at the same time [CW, May 24). IBM's full-duplex card is called eamer, and it can work at full-or the adapter for 10Base-T, 10Base-2 and 10Base-5 cabling types.

To get the full benefits of the new tech nology neers will need a switching hub, which IBM has no immediate plans to

month by LAN switch vendor Kalpana

IBM's expansion into Ethernet and FDDI is aimed in part at customers who are looking beyond Token Ring products for future LAN installations, observers

se To-

continue to cost two to three times ere than their parts for compa rable products However, in IBM Token Ring shops such as Enron

Corp. in Houston, IBM may have trouble breaking into new tech

does not plan to install Ethernet LANs, the company does buy FDDI adapters from Networth, Inc. in Irving, Texas, for its high-end servers and routers, which are connected by an PDDI backbone. "We may evaluate IBM's FDDt cards,

but we aren't in any rush to switch vendors," said Jim Queen, director of enterprise networking at Enron.
Overall, an IBM spokesma being first to market with a full-duplex

Ethernet adapter shows the revampe company "can turn down the screws and turn out the technology quickly," an approach that IBM will continue to take with its Token Ring products as well, he said.

Fast connections

5700 july 30

AN/WAN

UDS is Fully Focused on Digital Datacomm

In the accelerating transition from analog to digital datacomm, only UDS has a full line of switched digital devices that communicate across all predomant across chrologies (ISDN), Darapart, Switched DOS).

Products are fully developed and ready for shipment to datacomm users whose systems utilize DOS, switched digital, T1, fractional T1, ISDN or any combination of these advanced communications

rechnologies.

UDS digital products include multi-rate DSU/CSUs with speeds to 56/64 kbps, DSU/CSUs for T1 and fractional T1 applications, frame relay, statistical and time-division multiplexers and a broad range of ISDN

terminal adapters and network termination units.

Standalone models of UDS digital datacomm products

Standalone models of UUS digital data:comm products are easily convertible for space-saving, rack-mounted installation in UIS Data Shelf⁴⁸ enclosures. Unlike other manufacturers who offer narrow product lines for limited applications, UDS offers a full migration.

path to all-digital networking.

For complete product information and help in configuring your digital datacomm system, call

800/451-2369



A Salute The 1993 Information The

Established in 1990 to enhance the Computerworld Smithsonian Awards, Leadership Awards recognize individuals whose vision and values have set positive examples. Recipients are individuals or teams who have demonstrated outstanding dedication, courage and cooperative spirit.

Sponsors of Leadership Awards select their own nominating committees, typically enlisting the expertise of colleagues, customers, influential business associates and policy makers. Nominating committees have a balanced mix of perspectives, with representatives from corporate America, technology, and academic and public policy bodies.

Information Technolo Leadership Award for Lifetime Achieven

William H. Gates III



The MCI Information Technology Leadership Award in Educari



The SCIENCE APPLICATIONS CORPORATION Informa Technology Leadership Award for Global Integrat



The CRAY RESEARCH The CRAY RESEARCH nformation Technology Information Technology Leadership Award for adership Award for Breakthrough nputational Science





THE COMPUTERWORLD SMITHSONIAN AWARDS

THE FRE INFORMA

NETWORKS WERE SUPPOSED TO FREE INFORMATION AND MAKE IT AVAILABLE TO ALL, BUT SOMEONE

FORGOT ABOUT ALL THAT INCOMPATIBLE SOFTWARE AND HARD-WARE ALONG THE WAY. PRISONERS OF THEIR OWN DIFFERENT STAN-DARDS, COMPUTERS SPEAK TO EACH OTHER

SHACKLES ON INFORMATION ARE

IN THE RUDIMENTARY LANGUAGE

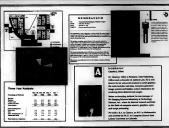
OF UNFORMATTED TEXT. TO DISTRIBUTE DOCU-MENTS SUCH AS SPREAD-SHEETS, REPORTS, BROCHURES OR MAGA-ZINES, IT'S BACK TO CUMBERSOME PAPER. STARTING NOW, THE

BROKEN, ADOBE "ACROBAT" IS HÈRE. YOU WILL FEEL THE FREEDOM AT ONCE.

Without touching your existing investment in software, networks or hardware. Adobe Acrobat software will dramatically increase the value of your information. Suddenly documents of any complexity can be sent electronically to any other user with Acrobat. Documents like those to the right are read, browsed, annotated, stored or printed by other Acrobat users. Information once far too costly to distribute en masse via paper can now be electronically shared by all. And these documents won't be outdated when the application is obsolete. The key to this remarkable technology is Adobe's Portable Document Format (PDE), Any Macintosh® or Windows" computer with Acrobat can read PDF files without needing the originating software or fonts. And, PDF files are remarkably small so storage and transmission costs are minimized.



EDOM OF TION ACT.



e, with forces, photos and other elements fully intact. Users can view and print.

CHANGE NOTHING. CHANGE EVERYTHING.

With little change in your hardware or software, without retraining personnel, companies will experience an extraordinary transformation. Computers will now become windows to information. With Acrobat, illustrated parts inventories will constantly he undated and available as needed without the crippling costs of paper and copying; extensive phone lists, fully-annotated medical texts, architectural plans, magazines full of color photography-can now be viewed on anyone's computer with Acrobat.

> THE NEW MEANING OF FREEDOM.

Instead of miles of files and acres of cold storage, imagine a complete electronic document library. Massive documents and blueprints, color photography, in-house

magazines · THE FACTS or any other document will be electronically displayed to

member of

one or every

the organization. In minutes, instead of hours or days. Paper will cease to be the only recourse for distributing documents. Instead, documents will be printed as needed. Information costs will plummet. Welcome to the new freedom of information made possible with Adobe Acrobat software. Just call 1-800-27-ADOBE, Dept. F, Ext. 0452 for more information or visit your Adobe Authorized Reseller.

CHANGING THE ECONOMICS OF INFORMATION



HDTV proposal

high-definition television (HDTV) edged a bit obser st month, thanks to an ent to merge competing HDTV transmission proposals. gotiated on and off for the past vo years, the so-called "grand almission's Advisory Committee on Advanced Television Service (formed in 1987) with a single plan. four systems developed by three groups: Zenith Electronics Corp. and AT&T; General Instruments Corp. and MIT; and a consortium led by Europe's Thomson Con-

mer Electronics and North American Philips, along with the David Sarnoff Research Center. Xerox displays

entists at Xerox Corp.'s Palo Alto Research Center announced last month the development of color and black-and-white flat-panel disshown for the first time at last month's Society for Information Display conference in Scattle, are etive-matrix LCDs ever develed. The 13-in. monochrome screen, with 3.072- by 2.048-pixel olntion, offers approximately 20 times the pixel count of 13-in ochrome Video Graphics Array desktop displays. The color screen offers 1,536 by 1,024-pixel

Cable Prodigy?

rodigy Services Coc opera-tor of the Prodigy on-line service, bycame the latest player to toss its hat into lier this month, the White Plains, N.Y., videotext firm said it planned to open its network infrastructure to third parties such as cable opvices. Prodigy is also developing its own interactive TV services. Prodigy recently demonstrated a prototype of this integrated TV/

On-line at the bus stop

Prototype system will give passengers access to fares, schedules

By Elizabeth Heichler ·

aiting for a public hus may never be the same if a prototype vehicletracking system slated for testing outside of London gains wide-spread acceptance. Next summer, bus passengers in Birmingham, England, will know exactly when the next bus is due to pull up to their

stop when a new microcomputertional satellites that used route and schedule system hits the streets The system will use navigational satellites to continually track the eition of individual vehicles, al- et offices will be sup-

wing it to calculate and display on terminals at each stop the arrivnext three buses. Besides gaining the convenie of knowing when the next bus is fCL computer over In-

due, passengers will also be able to overy on-street terminals about Heichler is a European correspondent at

the best route to a particular destination, as well as display associated fare and timetable information. For the pilot system scheduled to begin opcration in the summer of 1994, 50 buses on two routes running to the center of Birming-ham will be outfitted with equipment to re-ceive positioning sig-

nale from the navie make up the international Global Positioning System. Bus station and tickplied with intel Corp. 1496-based PCs run-

ning Windows; the remote locations will be connected to the tegrated Services Dig-

ital Network lines with ruspedized, vandal-resig

al Network lines. public use. These displays will
The bus stops will be equipped
ith ruggedized, vandal-resistant terface offering passengers "yes" on-street terminals designed for or "no" prompts.



Go back in 'virtual' time

By Ellis Booker

the IDG News Service

ing display of prehistoric artwork, France's Cave of Lascaux may soon be available to a much larger ence in the form of a virtual reality-based gallery tour. min Britton, assistant pro fessor of fine arts at Cincinnati's

College of Design, Architecture, Art and Planning, is working on a virtual reality version of the cave and its famous wall paintings "I really wanted to take the view

ers out the realm of the everyday and give them that sense of timees," Britton said, explaining why he wanted to use a virtual reality approach to the cave model in tonch-screen and interactive

videodisc technologies. Virtual reality proponents may its educational uses - such as touring a model of a Greek temple as it existed in antiquity - may be among the technology's most valu-

ole applications. For instance, another virtual redity project at the University of

of Mycensean temple complexes. Arguably the world's most strik-Unlike the Cave of Laseaux pr cet, however, this model will be used for archaeological study. Meanwhile, some of the most ad vanced work in the field is being

conducted al Carnegie McBon University's Studio for Creative Inquiry. "This is the first [virtual reality] lab in an art department in the U.S.," explained Cart Local project director of telecommuni ations and sistemal reality

"Virtual Egypt" This full Loeffler said be expects to complete the first virtual reality gallery in a 'petworked, virtual re

ality art museum." That gulle has been dubbed "Virtual Egypt "The goal is to create, in scale, ancient Egyptian architecture that users can walk through," be

The Egypt gallery will begin as a stand-slone display in a number of museums and will eventually be available on-line. Mnitiuser and op-line virtual re slity a special interest of the Car-

negic Mellon team, will be dem rated next month. On July 6, two users of Virtual Egypt - one in Pittsburgh and another in Tokyo at the International Conference on Artificial Reality and Tele-existence - will share the gallery si-

in the Cave of Lascaux tour, due to be completed next fall, students will be able to move about the cave and view lee Age images of animals, navigating the three-dimen sional environment with a joy

Going beyond mere presents tion of the cave images in a virtual reality setting, the tour also feaabout the cave and its contents and images that come alive when viewers stop to look at them for a length of time. Trying to essulate what be suspects was the "ritu-al/spiritual" aspect of the original cave, Britton's computer model in-cludes an area that, if the viewer tumbles upon it, will offer a se-

ect's software, was assisted by a variety of experts, including archi-tects, virtual reality consultants

"I've Had It.

We're Getting Hayes OPTIMAs. They're Affordable They're Dependable. I Can't Go Wrong."

As modern prices contin to drop, it's important that reliability doesn't. With the OPTIMA" family,

you can count on the quality of Hayes at very affordable prices. Data modems. Data plus FAX modems. Board versions. Even portables.

With speeds from 2400 to 14,400 bps, OPTIMA is Hayes quality at a surprisingly low price.

SPECIAL FEATURES. OPTIMA's Automatic Feature Negotiation selects the best combination of data speed, error-control, and data compression for throughputs of up to 57,600 bps to save big bucks on phone charges. Hayes' AutoSync eliminates the need for buying special adapter cards to communicate with PCs and mainframes. And to help avoid problems like data interruption and compatibility,

OPTIMA includes the Hayes patented Impro

OF ITAM Includes the nayes patented uniported Escape Sequence with Guard Time and Hayes Standard AT Command Set. Just some of the fea-tures that helped Hayes win the Computerworld 1992 I/S Brand Preference Award in 8 categories.

erature. In Canada, call

EXTRA BENEFITS FOR YOU. All this low-priced reliability is packed with our famous Smartcom" software to h you communicate easily in minutes. And it's all backed by a fast, efficient Hayes Technical Support team. Call 1-800-96-HAYES for your nearest dealer or product

1-800-665-1259. Hayes quality, low prices, and peace-of-mind. Think OPTIMA...from Hayes.



Go Ondine unith Hayer BBS; call 800 874-2937 or 404-446-6336.

Nikrycomputer Products, Inc., 713. Res 20020, Alderta, GA 20146. Repos, the literating, OFTIMA, and the Rayer 202 Engage Respect Products, Inc.

If this is how

your computer

does Windows,

have we got a

PC for you.



Don't wait. Put one of our Image" Series 486 PCs on your desk immediately. You'll get Windows performance that really screams.

And we're not the only ones who feel that way. In a recent review of the

NFC properted Image Series, PC local bus video technology to World wrote, "Say speed up graphics based goodbye to waiting applications for Windows Today. in Windows" as other makers

Making it fast. generation local Our ingenious bus video, we offer advanced. Image Video™ second-generation technology technology com-

develop firet.

bines second-generation local bus yideo with a powerful graphics accelerator, so even the most complex, most demanding graphics applications run full blast. And with our True Color support for over 16 8 million colors and photo-realistic images, those applications will have the impact of a speeding freight train. The bottom

line: Your produc-

tivity takes a fast turn skyward. Our new Image PCs are built for easy, 238-pin ZIF-socket upgrades to the next generation of Pentium-based Intel OverDrive" processors. We've also given them an on-board SCSI II interface, for quick connections to a

But wait: it gets even better. In addition, NEC's OptiBus™ technology can make those peripherals perform up to 30% faster than ordinary systems. While our ImageSync™

wide range of peripherals.

feature delivers flawless, flickerfree images with no adjusting when, used with one of our award-winning MultiSync* FG* monitors.

> The NEC Image Series. Just part of a whole family of great personal computers, from our affordable PowerMate* PCs, to our expandable Express* servers. So (why wait?), call 1-ROO-NEC-INFO or NEC FastFacts** at 1-800-366-0476, request document 46243.









Sour apples

I remember sitting amid a crowd of stunned reporters at the rollout of the Apple Lisa computer in 1983. The demonstration was mind-

ing for an audience who had never seen a graph-sterface. It was pretty clear to me that this was a se that was going to change computing forever. And so it did, or at least the Lina's more succ rintosh offspring did. The problem is that the Mac sh interface has changed little in 10 years, and ctitors have caught up. And that is translating stially big troubles for Apple. For three years. Apple has been searching for a

ror an ee years, Apper ans over our ching for a rategy that will take it out of the path of the Window liket train, it hasn't found one yet. For price-con-tions PC buyers (and who isn't one these days?), the osh no longer commands the price premium it e enjoyed. True, there are still more Ma we applications. But that disparity uidn't last long, as software giants such as Lotus land de-emphasize the

The price cuts Apple must make to stay competitive will continue to savage profit margins at a time when Apple cap ... it in new products. Apple's ecent moves to spread the multiple platforms will pay off stowly, and even then won't in-hibit Windows' cross-platform m

ing windows cross-puntioris momentum. The Acme slow ramp up that any product experiences the PowerFook, but that won't sastain past profit mar-gins. PowerFC looks great, but so do many other chips. No quick fix there. The Microsoft lawsuit? Porget it. Apple is at a crossroads. It sees the future and

knows bow to get there, but it has responded too slow ly to recent changes in the market to do so painteestly by to recent changes in the market to do so palaneously, particularly bitter pill for Apple to awaillow is its con-tinuing inability to define a competiting comporate computing arteragy. That overlating haun't been for inch of effort. Its Vital specification has been well-re-ceived by Maciantesh finanties but un't playing used a wider audience. The alliance with IBM buys Apple some legitimacy with IS, but the products aren't there yet. And then there's that burden of history. An execuyet. And used there a that currons or amony. As execu-tive in Apple's business marketing group tool of no last year that IS people still bring np.the 1985 "iemmings". TV commercial in Apple focus groups. Good huck to Michael Splinder, Apple's new CEQ. He's got a tough job ahead trying to get a great com-

pany back on track. ***

Sometimes when it ain't broke, you shouldn't fix it. Such is the case with our Page 2 table of contents, which we have fiddled with during the past year in rch of a happy medium between something that's ve and easy to read. Our recent minis ist approach was a colossal dud with readers. So the original Page 2 is back, redesigned to match our new look. Thanks for all your comm





With choice come consequences

"In users' hands" (CW, June 7) suggested that users are now in the position to dictate software and bardware selection and "then IS can figure out how to tie it all to-gether." Unfortanately, tying things together is easier said than done. IS professionals are already giving up their evenings, week ends and bolidays trying to keep the patch quilt of PC hardware and software running, and their resources and capabilities are rapidly approaching a breaking point. With choice comes responsibil

ity, and it is important for users to inderstand that their choices have consequences. Incorrect or inappropriate choices are costly and exasperate IS' corporate mission to provide reliable and rap access to data. It is to the user's advantage to promote a highly inte-

grated and supportable data pro-Encouraging users to do otherwise only makes it more difficult to

Richard Finkelstein

Readers overrule 'Objection!'

In "Objection!" [CW, June 14], Fabian Pascal demonstrates a serious misunderstanding not just of object DBMS technology, but of the claims of the object DBMS ven dors. His cornerstone point -that object DBMSs claim better handling of unstructured data, yet

don't deliver - is exactly back The modeling and perfo

claims of object DBMS products late to highly structured, complex data -- the kind that requires a be-wildering number of tables to represent in a normalized relati se -- and a SQL query long er than this letter to retrieve. In an object DBMS, data relationship are preserved in the database, not removed as they are in relation normalization. All applications can then benefit from the presence of these relationships to avoid re-lational joins and achieve perfor-mance gains of more than an order of magnitude over RDBMS on comparable data.

It's interesting to observe that just as the leading networking database vendor 10 years ago tried, unsuccessfully, to stop the progress of the relational industry by incorporating some relations features into its products, the leading RDBMS vendor is now anng plans for a major rel (sometime in the future) that will focus on features aiready offered by several object DBMS vendors. The result will probably be the deliver usable and cost-effective

David L. Gjimou Executive vice president Wreant Object Technology Mento Park, Cattl.

I would like to thank Computerworld for raising important is-sues in your In Depth article "Objection!" by Fabian Pascal. Pascal and C. J. Date are both fine writ and thinkers, but I would like to

give a practitioner's view. Application developers have al weak tools with many ragged edg es. They are accustomed to a

unting shortcomings in the tion paradigms. But the case with databases is

different - relational provides a olid foundation that must be accommodated, not wrestled to the ground. From personal experican be used to create robust, efficient applications in areas nor-mally associated with object-ori-ented DBMSs, such as CAD, by using the proper paradigm, suc as set-oriented processing.

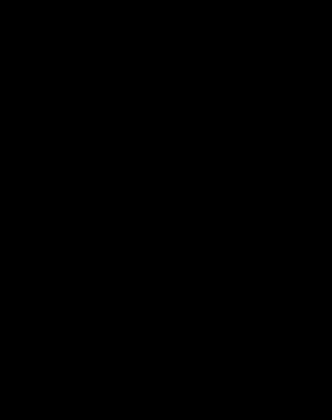
Databases should not be st

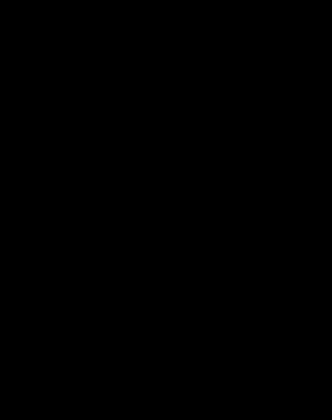
incketed by procedural thinking. The so-called impedance rais match is really a paradigm mis match — the belief that because bject-oriented programming is stream development techniques of the past, if is the best model for all cessing. Language-oriented ues such as poir be effective for dynamic, in-memory structures within an ar tion but are inappropriate for data that is persistent and distributed.

Lee Pesper El Cerrito, Calif.

#COMPLITERWORLD WELCOMES COMMENTS FROM ITS PEADERS, LETTERS MAY RE COUTED FOR BREVITY AND CLARITY AND SHOULD BE ACCRESSED TO BILL LABORS, EDITOR IN CHEF, COMPUTERWOOLD, P.O. BOX 9171. 375 COCHITUATE ROAD, FRANCIS MASS, 01701. FAX NUMBER: (508) 875-8931; MCI MAIL: COMPUTERWORLD. PLEASE INCLUDE A PHONE NUMBER FOR









"As the next wave

of technology rolls in, we'll help you ride it."















"PC" in PC Birect one of the best warrantes in the is for persons setors — and ad door more. All of which is brought to you by the people who design, build, sell and service more PCs than anyone else. So while you comment. Any time of the day

ns HelpCenter* is always the price, don't forget to factor the people behind the PCs into the nounting too

It stands for the Personal Care you can count on from professionals the IBM Service Representatives Call IBM PC Direct today Gat to know the PC people you've always And it stands for the Personal been looking for. And who'll Confidence that comes from knowalways he there for you ing you're getting a quibble-free.

pare how much PC you can get for

30-day moneyback guarantee. No qualms, quibbles or question Expert help from PC specialists 24 hours a day heed help deciding, deciphering and demystifying? Call us and we'll help. We're can also contact us by 24-hour

Free 1-year onside service. You send nothing to us, we come to

Fast, genuine ISM Service. If you do read to call us, our own service over \$0,000 service representa-tives, in more than 1,500 location

Program. If you need to repl

1 800 IBM-2Y0U

ISM Credit Lease. Don't have re

right specs at the but the right people are

too." PC Director of IBM PC Direct and Customer Support IBM Personal Computer Company-Americas A \$525 Value! PC Direct



"They listened,

they helped me, and made it easier to get

everything I needed."

Civin Hemora

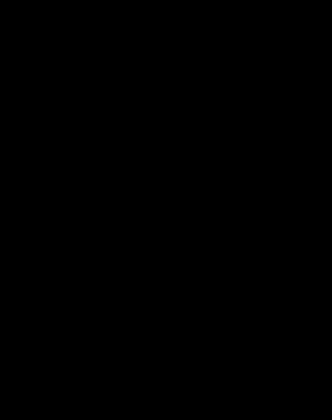


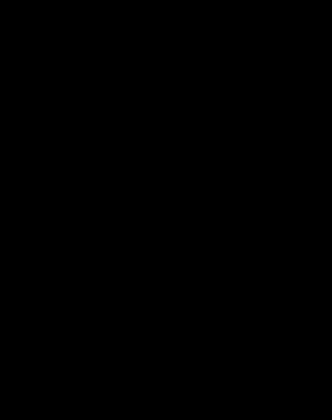


1 800 IBM-2YOU









COMPLITERWORLD

tet Harpell

Internal

of Copy Sales

A (relatively) painless way to move to client/server

e all know client/server is incvitable. The real question lim't whether to make the move but how quickly and radically to do it.
Users want their applications in
that environment NOW. But you know that rustling to migrate is a sure way to do serious injury.

You have choices: Give &-speech about the dangers of distributing critical data; bow to pressure and scramble to move key databases

Users want access to data from their PC and Unix workstations. You want to minimize de velopment and migration time and maintain a centralized control of the data. The best way to satisfy both requirements is to develop ap plications using object-oriented approaches to screen building and data retrieval while leaving large databases on the mainframe. in the past three years, many compa

have developed object-oriented approache not only to building GUIs but for retrieving data across platforms. Tools are available from sys tems vendors and third-party suppliers.

The oeed for centralization and enterprise

wide data modeling cannot be overempha sized. In the coming years, effective integr tion of data is likely to be one of the key distinctions between companies that are effi-cicul and profitable and those that are not. At Mike Parker



ast for the moment, effective integration is out apt to be achieved by keeping databases

There are products available that offer ac-cess and retrieval of data from multiple platforms. Some work; some don't.

In most cases, users don't really care where the data resides or llow it is managed, as long as they can get to it. Most of them have no interest in time-consuming and unrewarding chores such as logical and physical database design, backup or installation and monitoring

of databases. What they are interested in is easy access. Give them that and most will be happy to leave the rest of it in your hands. This strategy will also give you sufficient time to accurately estimate future database

for that charges by the total number of en ed users can testify that the new math in ed comes as something of a she

Client/server is a permanent shift in comp ag, so a full-scale transfer of data will have g, so a full-scale transfer of data was nave to keep place eventually. All 7m saying is don't she it. Too many deadlines for migration to sent/server have been based on expairing sinframe leason. This may make good bus-ess sense. However, it may be even more son ing to get great icase rates for mainfram

they want now and b you the time you need to ensure the safety of criti-

Parker, a systems integration consultant in Tules. Okla., has also worked in a number of corporate IS de partments in 15 years, he has done more data migra

With Windows and OS/2, perception is reality

FIRE WATCH by John Gantz

hile at Comdex last month, I attended a soirce bosted by IBM's Personal Systems Programming (PSP) division for key OS/2 developers, business partners and a handful of consultants, Excite ment was high. The OS/2 2.1 re lease beat Windows NT out the door, and IBM could legitimately call Windows NT vaporware, especially the advanced server version It was a nice party. But I couldn't bein feeling a general uneasiness. The other name for Com-dex was Windows World, after all, and the show floor was full of hardware vendors show ing their boxes running NT. Outside the door of the IBM gathering, boardes of Microsoft velociraptors (see Jurasete Park) bay in wait.
Well, at least OS/2 has a powerful parent to

otect H. Or does it? I find myself wondering if OS/2 isn't likely to wind up an orphan. Certainly the IBM PC Co. will have to jump on the NT bandwagon. If Compaq, Dell or AST preinstall NT on their Pentium machines, do you think IBM won't? I haven't ran into many

IBM PC Co. insiders who believe OS/2 can help So what's left for OS/2? A useful niche, pe haps, as a client/server operating system in IBM-only shops or as a specialty development system, but not the volume market Microsoft expects for Windows NT or further bigh-end re-

in fact, I expect that sooner or later (proba-bly sooner) IBM will require that development of future versions of OS/2 and related products, such as LAN Manager, be funded out of reve-nue. That will be a tall order in a market domiated by Microsoft and Novell

nated by Microsott and Novell.

I have data to support a contention that NT
is, even before shipment, the mainstream 33bit operating system for Intel platforms. In a
recent survey of 200 volume PC buyers and 100
receilers, my company found that most respon-

than OS/2 will be within 18 mounts, even accu-current OS/2 amers and resellers.

Worse for EBM, users of OS/2 who had evalu-sted NT rated NT higher on some features, such as the Workplace Shell user interface, the System Object Model and technical support.

To IBMers and OS/2 developer advocates

nd I've talked to more than a few), these realts are crazy. Anyone proficient in the Sys-em Object Model would swear it is light-years head of anything NT has. And more than a few chnical reviews rate Workplace Shell well above Windows. Besides, NT still isn't shipping and will require 16M bytes minimum when it

What gives is Microsoft's power to brainwash developers and users, the ubiquity of Windows and (commerced with IBM) precision drill-team coccution. A couple of weeks ago, for instance, I was part of a three-city road show for users of a negative for three-city and for the common state of the

OS/2 still has some mouse-unism store appearations come every day, sore pilot systems are being rolled out across whole departments and IBM has been debugging it for years. But there's little doubt in my mind that NT will sooner or later, rear past OS/2 in applications.

With luck, OS/2 will be successful enough to sell Microsoft on the idea of future joint develop-ment that merges the two

Corp., where he is responsible for all research under suiting in desiston automation and workgroup and

COMPUTERWORLD JUNE 28, 1993 33

FRE COMPLETELY TWO-FACED ABOUT UNIX.

One of the best things about UNIX has always been its ability to run on different kinds of hardware. We think a UNIX word processor should have the ability to do the same.

Presenting WordPerfect* 5.1 for UNIX. Inside every box of WordPerfect 5.1 you'll find both a version for GUI (Graphical User Interface) terminals and a version for character terminals. Whichever you choose, you'll get the level of performance that earned UnixWorld's

Best Product of 1992 award.



With WordPerfect's GUI version, you'll enjoy a screen that's clear and easily customized. Extensive windowing abilities for copying or pasting between as many as nine documents at once. Not to mention a Ruler for point-and-click formatting, a Button Bar™ for creating shortcuts to any feature or function, and a very convenient Zoom Edit command.

But what if you don't go for the GUI: Just choose the Character version, and Comprehensive Ruler. Access dozens of for at the click of a button. depending on your hardware, you'll get



great-looking features rarely seen on a character terminal. Like document preview, column layout, and other important features such as easy-to-use drop down menus and easy-to-understand help screens.

All of which leads to how easy WordPerfect 5.1 is to support. Its cross-platform compatibility makes transferring documents between other

versions of WordPerfect (like DOS or Windows) virtually foolproof. What's more, its functions are familiar to more users than any other word processor in the world. So find out today about the program UnixWorld declared "a breakthrough" that

"deserves applause." Call (800) 526-5053 for your free descriptive brochure.

VordPerfect

Charles Babcock

Relational backlash

You know that what used to be the your ger generation isn'tso young anymore m its leaders start taking shots at the at coming up behind them. That's at's happening now with some of the ases as ry train their sights on object databa

ment systems (ODBMS). This is strange because at one time, the boary guardians of hierarchical and Codasyl systems said the same sort of es about relational. John Cullinane president of the late Cultinet Software, used to tell me, "IBh may ship a lot of copies of DB2 but they're all sitting on the cu ners' shelves," Right, Cullinet was acquired by Computer sociates about a year lab

Once again you can bear th me of disparaging com-its beginning to pick up: u don't need object-orien tional can do everything they can

s....Object-oriented re s in a loss of data indepe tes, having been on the le g edge for 10 to 12 years, to able opinion has moved on to something else. The temptation is to tell the upstarts they don't know what

At their worst, the relational defend-ers say ODEMSs represent a step back-ward. ODEMSs resemble the old Codasyl databases with their dependence on pointers to locate stored objects, but it is hard to see this as a vice if the systems

on manage objects effectively. Object databases answered a ers who needed a place to store their relatent data. CAD and CAE users in rticular sought to store objects, and oct-oriented databases sprang up to

neceed in dealing with objects as ob-sets. They do not need to break them wn or flatten them as relational sys ns do. There are a variety of meth tiffer to locate the object intact.

The nature of this system gives of abases a claim to speedier retrie ons such as joins. Clearly relation

ant to give object databases their due ODBMSs are built as object-handling systems capable of preserving the chi-acteristics of the objects they store nes. inheritance and messaging

data, processes and messages, it is diffi-cult to restrict them to a few simple data cut to restrict uses to a row simple usua-types. To store an object, "you have to have the processes inside the database as well as the data," notes James Odell, chief methodologist at Inference Corp. and co-suthor with James Martin of rinciples of Object Oriented Analysis

nd Design. Relational systems can store objects, into components and store them in ta

bles. In an analogy that originated with Eather Dyson, editor of the newsletter "Release 1.0," this is like driving your car in the garage. It can always be reassem bled again in the morning, but one even tually asks whether this is the most offi

ot way to park a car. Relational systems were designed to deal with a few data types within the con fines of a strict logic. Object databases were designed to deal with the rich variety of data types in a few limited ways.

wand and make the difference go away ck is Computerscorld's technical edit Ule MCI Mail address is \$21,0232

THE GENICOM 7170 NETWORK LASER PRINTER

'Do it all' paper handling



at a 'Do it now' price.

\$3,995 Save 25%

fully-integrated, large-capacity (1500-sheet) feeder Fully-integrated, large-capacity (1500-sheet) stacker 17 ppm, 300 dpi with print quality enhancement technology

erful emulations like HP IIISi® (including PCL 5® with HP-GL/2*) and IBM Proprinter* XL24E USPS-certified POSTNET" bar code ready

One-year on-site warranty

\$4,495 Save 28% Everything in \$3,995 package, plus:

- Additional 4Mbytes of memory Available ontions include
- Multipurpose feeder
- GeniScript, a PostScript®-compatible interpreter a 10-bin malbox sorter
 - GeniLink interfaces for easy and economical network

Special bundled introductory prices through July 31, 1993

THE GENICOM GUARANTEE

- We guarantee that our 7170 laser printer will run on your network
- ✓ We guarantee factory-direct, rapid-response service from 130 sites
 ✓ We guarantee factory-direct technical support, just a toll-free call away
- ✓ We guarantee customer satisfaction

all today 1-800-4-GF MCOM

GENICOM

Ever since Apple, IBM and Motorola formed their alliance, people have expected something big.

Well, it's not so big, but it's amazingly powerful.



Introducing the PowerPC* family of microprocessors from Motorola.

How powerful is our first tangible result of the Apple, IBM, Motorola alliance?

Unlike any other microprocessor, the PowerPC Microprocessors have the power to change the course of computing.

The PowerPC family of microprocessors will bring unprecedented high

The PowerPC family of microprocessors will bring unprecedented high performance to everything from hand-held computers to desktop computers to supercomputers. It will run circles around its only real competitor, the Intel







Pentium" microprocessor, and it will do so at a fraction of the cost. It will run today's standard computer operating systems, as well as those that are being developed for pen-based and object-oriented computing. In fact, PowerPC Microprocessors will play a pivotal role in the imminent convergence of computing, communications and lifestyle products.

Yes, the PowerPC Microprocessors from Motorola have the power to change the course of computing.

PowerPC Microprocessors. Changing the course of computing. For the better.



M MOTOROLA

It has the power to blow away Pentium.

The latest in the line of X86-compatible microprocessors from Intel, Pentium, is quite powerful. However, it is not nearly as powerful as the PowerPC family of microprocessors from Motorola.

It is not nearly as power use an ervoer. Canany of unknowned seeds of the descension of the control of the first of Motorola's Dowerf Coliferoprocessor, the Dowerf Colif Microprocessor, will bring work-station-like performance to low-cost PCs. Its integer performance (how fast it handles basic computer functions) is equal to Pentiums. In disting-point performance (the speed you need to crunden humbers, run graphics, video, voice and the like), the 601 is a full so percent faster than Pentium, with no loss in integer performance.

While the 601 outruns Pentium, it actually runs cooler, because it draws only 8.5 watts of power to 16 watts for Pentium.





The 601, of course, is only the beginning. Over the next eighteen months, we'll ship ever more powerful versions of the PowerFC Microprocessor. The low-wattage PowerFC 607 Microprocessor will bring unprecedently proceed computers. The PowerFC 604 Microprocessor

will push high-end PC and server performance to new highs. The PowerPC 620° Microprocessor will run at 200 to 400 SPECmarks in high-end workstation, server and supercomputer applications.

PowerPC Microprocessors from Motorola. They have the power to take you further into the future than the competition.

PowerPC Microgracessors. Changing the course of computing. For the better.



It has the power to lead a revolution.

Personal computes are an New York of becoming infinitely more useful, more usable, more communicative and more mobile than they are today. A number of advanced technologies—real-time video, wireless networks, voice and handwriting recognition and object-oriented programming, among many others—are ripening, converging and becoming affordable all at once.

The one thing all those technologies need is extraordinary processing power. Processing power that only PowerPC Microprocessors can deliver.





In its various forms, the PowerPC Microprocessor will provide the right combination of high performance, small size, low power consumption and low price that make it the only real choice for an incredible variety of applications. From massively parallel central servers, desktop computers and pocket-sized digital notepads to voice/data communications systems and automotive control units.

In the very near future, computing will look very different. That difference will be powered by PowerPC Microprocessors from Motorola.

PowerPC Microprocessors. Changing the course of computing. For the better.

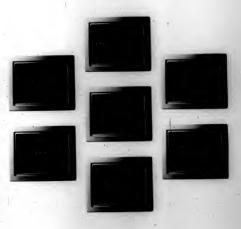


It's as open as it is powerful.

De antival of the PowerPC Microprocessors from Motorola, computing is officially open—wide open.

PowerPC Microprocessors will run every popular personal computer operating system, including the Apple' Macintosh' OS, OS/Z-Windows' and, via emulation, even DOS. They'll also run standard variations of the UNIX operating system, specifically, the PowerOpen-Environment (based on IBM's AIX with the Macintosh interface) and Solaris' from Sunsoft,





Perhaps most importantly, PowerPC Microprocessors soon will run the new processor independent operating systems, including the one forthcoming from Taligent (the Apple/IBM joint venture); as well as the real-time operating systems for embedded confrol and those emerging for mobile, pen-based computing.

PowerPC Microprocessors from Motorola. From supercomputers to pocket computers, the world is now open.

PowerPC Microgrocessors. Changing the course of computing For the better.



Of course, power has its price.

That price is low, as in personal computers priced under \$2500 that are faster than any PC on the market today.

You see, PowerPC Microprocessors from Motorola not only deliver significantly more power than Intel's Pentium microprocessor, they deliver it at a fraction of the cost. The reasons are quite simple. Through Motorola's superior design and manufacturing technology, we've packed more power into devent transistors. We deliver that power on a chio that's less than half the size (100 square millimeters vs 262 square millimeters).







Essentially, that means we can manufacture over twice as many microprocessors in the same time and space as Intel can.

PowerPC Microprocessors from Motorola. For those who make computers, they offer the opportunity to build high performance, low cost computers profitably. For those who buy computers, they will cost you a lot less to be powerful.

PowerPC Microprocessors. Changing the course of computing For the better.



PowerPC Microprocessors.

Changing the course of computing. For the better.

To take a closer look at the future of computing, call Motorola today at 1-800-845-MOTO.

We'll be happy to provide you with more information, including our free PowerPC Information Pack.



David Coursey

Microsoft for all



ting system features from

ter application developers. Mi-stoft denies any wrongdoing. and the issue is likely to wind its way around Washington and Red-mood for quite some time, tarnish-ing a company that is most cer-tainly a national treasure.

So, instead of investigating Mirosoft, I'd like to make a "modest proposal" of my own, one that would really make Microsoft a aal asset. Being a reporter, I'll shift into my best Associated

Press style to share my idea with WASHINGTON, D.C. - In a surcreate a special tax to provide free software to all Americans. Clinton also appointed the company's co-founder, William H. Gates III, to a time term as U.S. technology czar, a newly created enbinet-lew

"It used to be a chicken in every pot, but today we need a computer pot, but today we need a compute in every home and that requires software, "Clinton said in an-souncing the federal buyout, which will pay Microsoft shapers the full value of the com pany's stock at the close of tradit yesterday. Vice President Al Gor-who had promoted the buyout ide in private White House discus-

sions, will shepherd the deal through Congress, the president

Export strategy Clinton described Microsoft as a key component in his plan for a re-surgence in American trade over-

Gates, who founded the com ny as a teenager, will remain in-day-to-day-costrol of Microsoft but will gain new responsibilities as the natioo's chief strategist on

technology policy. "There is no one more qualified, more able, than Bill Gates to guide America's development of the nology necessary for an inforsaid. "In his government role, Bill will be able to develop policies that

prine move, President Bill Clinton today announced a \$75 billioo plan Coursey, page 52 to nationalize Microsoft Corp. and

Xerox develops OCR for Windows

WXerox imaging Systems, a whotly owned subsidiary of Xerox Corp., is about to deliver a Sop optical character recognition (OCR) software package for which down, it converts paper documents into an editable format is competible with word processors from compenies such as WordPerfect Corp., Microsoft

ed on technology develope at the Xerox Palo Alto Research Center, TextBridge makes use of neural network technology and other mathematical algorithms to convert digital images that were either faxed or scanned into PC file formats that are compatible with the leading word processing, spreadsheet and data

can be written in English, French, Italian, German or Spanish using virtually any typoface.
"This is one of the few software
packages that actually does what
it is advertised to do," said Ed Letourness, president of Hydro

peries. Inc., a consulting firm for ctric power plants that is based Thus far, Letourneau said be has used a beta-test version of TextBridge to import about 3,000 pages of technical documents into

a file format that is compatible with FrameMaker from Frame Technology Corp. in San Jose, Calif., and Lotus' Manuscript offer-TextBridge is about as fast as

any of the OCR packages out there, and it's far more accurate," Letourneau said. TextBridge, which includes a Dynamic Data Exchange facility to

Mobile computing

Transition time for pen

By Michael Fitzgerald

Pen computing is dead! Long live pen com-

There is a new model for the pen com market. A skew of announcements seeks to meld pen input technology with conventional computing and make good oo promises made

"Pen computing is not a market, just like wireless communications is not a market," said Richard A. Shaffer, editor of "Computer-Letter," an industry newsletter in New York.
"They're technologies, and customers don't
buy those. They buy real benefits."
Shaffer said the benefit of pen input is the

way it enhances highly mobile computers that are too small to effectively accommodate a key-

cements signal a treed toward pee in-

setter. The Und Con-bridge of the Corp. 25 MHz 1498SL chip. It is also one of the first portable systems to bundle socket ser-vices for the Personal Computer Memory Card International Association shot. The product will retail for \$2,000 when it debuts in July.

After an aborted attempt a year ago, Zenith Data Systems also has added pen computing to its list of technologies. The Z-NoteFad 425LN turns the Z-Note 425LN notebook turns the Z-Note 4551.M notebook into a combination notebook and pen-based computer, much like the Convertible, but with a detachable screen. The Z-NotePad will cost \$2,000 and is shipping now.

Ahn Software Corp., a Montain View, Callfi, start-up, introduced lakWriter, which allows users to manufulate text centered with a pen without having to first convert the information to convert the information to exceed the information to encounter the information to me.

ters. Effectively the first word processor orionted for pon input, inkWriter can also turn ink sketches into computer graphics. It will cost \$249 but will be introduced at \$190 in July and

First word processor for digital ink debuts to applause

gence Corp. said they have developed peaceu-tric objects for Borland's dBase IV. This will al-low dBase to recognize and use data that has

been entered with a pen.

Notable Technologies, Inc. in Oakland.
Calif., and Compact Services, Inc. in Greenwich, Conn., said they would jointly develop new host-to-pen computer-oriented communications software for Go Corp.'s PenFoint oper-

Dusphin Technology, inc. in Lombard, III.,
Dusphin Technology, inc. in Lombard, III.,
dit is shipping its DTR-1, a Cyrix Corp.,
SSELC-based pen and keyboard mobile counter that weights inset than 4 poznets.
Compaq Computer Corp. also cast its many
compage Computer Corp. also cast its many
consideration of contract and contract in the contract in th

d Aba's inkWrit

charibed its marketing plana. Harrieti D by managing director for the personal co-nicator business at AT&T, said the con-has decided against a sociding plan it we sidering, in favor of other ideas. For its



Nows

You wanted the power to choose from a world of different applications. DOS applications. Windows" applications. OS/2* applications. OS/2* 2.0 gave you the power. And the response was impressive, to say the least. Over two million copies shipped in less

than one year. More than 1,200 OS/2
applications already available. But now you
want more. More features. More functions.
More applications to choose from. That's
why were introducing OS/2 2.1.

The new OS/2 2.1 lets you run the latest Windows 3.1 applications, in addition to the DOS, Windows and OS/2 applications you can already run. We've also added True1/pe fonts, select Windows apples, File Manager and support for Windows 3.1 printer and display drivers, including 22-bit seamless SVGA support. And now you can start DOS and OS/2 applications from a WIN-OS/2 session, too.

Portable users will be glad to know that OS/2 2.1 provides industry-standard Advanced Power Management (APM) support, to help extend battery life.

your



There's no need to buy DOS and Windows to ran DOS and Windows applications.

We've made the cursor larger so its easier to find your place on the screen. And OS/2.2.1 continues to exploit the very latest in technology. You'll find improved support for multimedia applications and pen-based capabilities, along with built-in CD-ROM

Of course, OS/2 2.1 still gives you true pre-emptive multitasking, superior OS/2 Crash Protection" and the easy-to-use object-oriented Workplace Shell interface. All the features that made Version 2.0 an award-winner. But now, you also get a whole new world of possibilities.

OS/2 2.1 is now also available on

and AS/400° terminal emulation support.

OS/2 2.1 is now also available of CD-ROM. It comes with exciting

Fig. 652 2 to also have of your FC, you can now a world of 505, Findence and 607-apphreness.

To order CD ROMEwen had of DSQ applications, call that is, C Deep at 1 900 798-9007 (RM ASARD) and DSQ are represent trademants and DSQ Clean Fraucation, Ribridgiess Shell and "Operate at a logist lavel" are trademarks of insurational Bourcess National Exposation Telecomes is a materian of Microsoft Corporation True"type in a Individual Augist Computer Inc. 67900 884 Carp.

Introducing



chance orun multimedia samplers, full-motion video demos and more. Demand OS/2 2.1



preloaded on your next PC.

With our free demo diskette, you can find out even more about all the powerful features OS/2 2.1

has to offer. For your copy, to find out more about OS/2 2.1, or to order, call 1800 3-IBM-OS2. In Canada. call 1 800 465-7999.

Operate at a higher level."

OS/2 2.1 Advantages

Viruses continue to wreak havoc at many US companies

orthy after the White House announced that ad flooled up President Bill Clinton and Vice esident Al Gore to the Internet, Gore said. "The Clinton administration enthusiastica supports National Computer Virus Awarene

White House officials revised to say whether novice Internants Bill and Al had met Michelan-gelo, Dark Avenger, Jerusalem, Stoned or any other digital demon, but such a high-level state-

rus awareness would have been unimaginable just a few years

the tendency for hype that has plagued the virus and security isputerdom will see gs get worse before they get better, id. Among the staties put forth at the June 9 Virus Awareness Day kickoff on

rations by the Natio al Computer Security Association (NCSA) and Dataquest, Inc., 63% of respondents said they had battled

· Viruses will cost American business \$2 billion next year. •More than 2,100 viruses are known to exist and 50 more are created each month.

*The average virus attack affects 142 PCs and takes 2.4 days to eradicate. One quarter require more than five days to correct.

Ntyths abound

Many corporations refuse to discuss their coperiences with viruses or their efforts to avoid
them. But 3M Co., which sponsored Virus ness Day with the NCSA, did not bold back. Virginia H. Hockett, information technology manager at 3M and an alumna of the National Security Agency, said a survey of employ-ees showed that while 95% had heard of computer viruses, the majority were not sure

The majority...regarded antivirus s ware as a complete cure ... [and] more than 55% answered that they had spent no time in the past year educating themselves on how to prevent or combat viruses," Hockett said.

NCSA board member Peter S. Tippett, direc-tor of security and enterprise products at Sy-manice Corp., said the following common mis-

conceptions still exist:

"Viruses will set your data." in fact, viruses
rarely destroy either data or software. The biggest problem is just getting rid of them.

"Computer bulletin boards are a leading
source of viruses." No. The common boot-

ted this way. No corporate policy related to bul-letin boards will have a noticeable impact on

virus problem. "Most viruses travel in pirated software; few are transmitted via data-only diskettes." Just the opposite is true; while viruses do not infect data per se, they do infect diskettes carrying

"There are good viruses and bad viruses." There are no benign viruses; because all by definition replicate without the user's knowledge

41%

PLUCENT OF PCS BASE: 600,000 MIDLIFFLE EFFECTS

\$44,000 to cure.

times at considerable expense. · Viruses come in waves." No, news of various viruses — for example. Friday the 13th, Columbus Day

and Michelangelocomes in waves, but the viruses them selves have grown steadily and predict-On the rise Micki Krause, mini-

computer and microcomputer security manager at Rockwell International Corp., said Rockwell saw virus incidents peak at 600 in 1990, then decrease as stringent antivirus measures.

were taken. Now, however, she said they are on the rise again at Rockwell as the number of viruses meresses Viruses are being written so fast that antivirus software can't keep up," Krause said. One

Protection policy

M's antivirus policy contains the follow-ng provisions, among others: *Change passwords every 30 to 90 days. Write/protect files when possible so hat an error will occur if a virus tries to

modify the file. ·Use "shareware" only under strict suidelines and "freeware" not at all. Never run programs at work obtained

*Learn the signs of a virus attack, which include unexplainable loss of free memo-ry, programs taking longer to load or exc-3. programs unting tonger to load or counte, changes in the or program size, rint routines that stop working. These agus of the computer, strange beeps r messages or computer reboots in the die of a process.

TransferPro unveiled

By Christopher Lindquist

and browsing through file con-tents. Various file-filtering tech-niques ease the transfer of files LOSALAMOS, N. M. Digital Instrumentation Technolfrom one system to another, in cluding file name filters that reogy, inc. has announced the avail-ability of Transferdence with the standards of each

roduct that allows Unix systems to read and write to Macin teeb and MS-DOS

users can perform file related tasks on DOS and Mack

ms. A version for Hewlettsystems. A version in Packard Co. Unix workstations is due shortly. Pricing begins at \$90.

rently available for

Iris and Personal Iris

working services to U.S. omes and businesses. The president's strong endorsement of Gates, however, clearly suggests the 30-year-old billionaire might have carte blanche to develop poli

cy as he pleases. The moves were widely had on Capitol Hill as important ele-ments in the establishment of a national technology policy, with both Democrats and Republicans pre-

dicting swift approval by Con-

or, criticizing the tax allowing any American unlimited use of Microsoft soft ware and also provid ingfor software

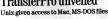
companies adverse affected by the nationalization move. One Republican sen ator vowed to fight Clinton's propos



Job for Jobs? in a related move, the president a no said he was revising his contro versial jobs bill to provide \$16 bil-tion to fight unemployment at object-based operating system companies in Redwood City, Calif.

The mancy would specifically tar-get Next, Inc., where former computer whiz-kid Steve Jobs contin ness fiets for survival. Republicans have already said the jobs bill is a sham, not intende to provide a job for Jobs but to distract Ross Perot, who holds a me

jor stake in Next, from entering the ursey is editor of "P.C. Letter," a San Mateo, Calif., Industry newsletter. His







Coursey

CONTINUED FROM PAGE 49

will affect all Americans."
Dubbed a "Microsoft tax" by or
GOP senator, Clinton's National Software License Foe will be collected as a surcharge on the inlocted as a surcharge on the to-come taxes paid by Americans with annual household incomes higher than \$50,000, a treasury de partment official said. Revenue from the tax is expected to total \$15 billion, or \$60 far every Ameri can For that amount, Clin promised free software for all, including the latest interactive names and

business applications. New software will be released through post officer and other federal agencies, atthough long-term plans call infection cost the company an estimated for distribution via ca

"No comment"
Administration offi-

cials would not comment on what effect the Microsoft buyout might bave on the company's reported plans to form a new company. Ca bleSoft, to create software for interactive televisions and other de vices. A White House spokesperson said talks between Micro soft, media giant Time Warner, Inc. and cable television leader Tele-Communications, Inc., would con tinue. Microsoft will be in a much

stronger bargaining position as a result of the bayout, the spokesman said. It is unclear whether Gates' a ministration position might en-able him to pressure the Pederal accept Microsoft-tuspired plans

Talk about strength in numbers. Lotus 1-2-3; The World's Most Popular Spreadsheet," is now optimized for OS/2. 1-2-3 for OS/2 offers the ease of use 1-2-3 is famous for, while exploiting the 32-bit power and advanced

graphical environment of 05/2. Now you

nonstop with multithreaded background printing and

Solver, With OS/2 Crash Protection," you can simultane-

ously print, recalculate and input data without thinking twice. And 1-2-3 for OS/2 takes full advantage of the Workplace Shell' object-oriented interface.

Drag and drop a data

object onto the printer or shredder. Drop it onto the 1-2-3 program object, and OS/2 launches the application and loads

the file in one simple step. There are even more enhancements, like

SmartIcons*one click shortcuts to frequently

used commands. The new Draw Layer lets you paste, position and size graphical objects from the



OS/2 clipboard to anywhere on the worksheet. Plus you get features you already know, like true

3-D worksheets, Solver and BackSolver, file linking, and external database access.

Of course there's compatibility with previous 1-2-3 versions and other Lotus products, too. In fact, there's incredible integration when installed with Freelance Graphics' for OS/2. All in all, when

you see how much it offers, you have to give this 1-2-3 a 10.

To order or to find out more about OS/2 2.1 or Lotus 1-2-3 for OS/2, call 1800 3-IBM-OS2.

In Canada, call 1 800 465-7999. Operate at a higher level.™





Mac accelerator cards step on the gas

DALLAS -

hall who always has the speediest ma

If you're a user of an older Mac have a new ally in Applied Engineer ing, inc., which recently unveiled a se

The TransWarp Eclipse 4300, 2300 and 1300 cards offer the ability to draz

y increase the speed of Macintosh mod-de LC, LCII, LCIII, Performs 400, SE, Classic, Color Classic, Mac II, IIX, IICI, ISL HFX, HVI and HVX. Applied Engineering officials say the

boards can boost the computational power of even the most sluggish Macinsh by as much as 12 times

ods: the addition of Motorola, Inc. 65030 and 69040 chips and a technique call Totatia PAM on

A static RAM cache is a very fast sec on of memory that resides between the

ain motherboard and the CPU. It works by taking instructions from the slower ard memory and placing them in fast static random-access memory The instructions are executed much more quickly, resulting in greatly im-

With optional support for Apple's Virnal Memory feature, users will be able to use hard disk space as if it were sys-

tem RAM.

The boards could have an enormous
market among the millions of users of
older Maciniosh models. Pieter Hartosh models. Pieter Hartok, editor of the Macintosh-geared artsook Letter" in Alameda, Calif., es sated that there are 10 million Macin

abes on the market, many of them older All models of the TransWarp line are expected to be available this summer with prices starting at \$199.

XyWrite for Windows set for August delivery

By Michael Vizard BALTIMORE

Nebartis who have remained loval to the XyWrite word processing software from The Technology Group are about to have their patience rewarded with the longawaited arrival of XvWrite for Windows. Due in August, a Windows implemen-tation of XvWrite will bring many profes sional writers and editors into the Win dows mainstream for the first time Currently, XyWrite users, many of whom ssional journalists, must exit Windows in order to access their Xy-Write word processing software under

"Tve got a late beta version of XyWrite ws, and I haven't been able to crash it yet," said Tony Kahn, a producer for American Public Radio in Boston.

New features in XyWrite for Windows include the ability to create multiple notebooks that hold related files, the ability for writers to create their own shorthand notations that are then automatical nded into full proper names, and the ability to create style sheets that maintain uniform formats across mutiple

In addition, XyWrite for Windows includes a command line that allows users to reduce keystrokes and mouse clicks It also provides a library of buttons that users can customize with the commands

y use most often Kahn, who acknowledged that he is not such of a Windows enthusiast, said he prefers XyWrite over other word proeasing packages because it is simpler to

"With XyWrite, I don't have to go through multiple commands and meuus to change a format," Kahn said. Priced at \$495, XyWrite for Windows requires 2M bytes of random-so nory and anywhere from 3M to 9M to 6 of disk space.

Put The Power Of Your AS/400—On Your Lap

Lynx*9466 makes the remote Mac or PC ection to your AS/400* from wherever

Query your AS/400 from your desk or hotel suite. Download files and combine data and laptop graphics in one sit-down session.

A standatione unit, InterLynx doesn't require a free stot in your Mac or PC. Add a modern and Andrew software, and you've got all you need for dynamic AS/400 access.

And whether you've dialed in from a M or PC, InterLynx supports 5250 emulat and file transfer software. Your laptop ac a true 5250 terminal

This means convenient laptop-access to the vast data storage of your AS/400 at any time, from any time zone.

of an AS/400—brought together by Intert.ynx/400 and Andrew.

00) 328-2696 ext 281 (+44) 734 89





We think it'll be pretty well received, too. Fax/PM™ is a full 32-bit OS/2* application that makes it easy to send and receive faxes right from your computer. Whether you're in a DOS, Win-OS2 or OS/2 session running under OS/2 2.1, now you have the ability to send faxes from any full-screen DOS,

Windows, or OS/2 application - without leaving the application. Just select the Fax/PM driver as your printer. Fax/PM also really capitalizes on the advanced features of

the Workplace Shell™ object-oriented interface.

You can send faxes right from the

Workplace Shell by simply dragging and dropping a data object to the fax object. And thanks to OS/2's true pre-emptive multitasking capabilities, you can send, receive and print faxes in background mode while you continue working with

other applications. Features like these are too good to keep to yourself, so there are also OS/2 versions available for LAN and

client-server environments, all CID enabled. And application developers will appreciate APIs that allow

for integration Fax/PM engine into custom applica

could go on about how Fax/PM and OS/2 can make your PC an even more productive place. But we'd rather let the fax speak for themselves.

Send faxes right from the Workplace Shell, or from any full-screen

To order or to find out more about OS/2 2.1 or Fax/PM, call 1800 3-IBM-OS2. In Canada, call 1 800 465-7999.

Operate at a higher level."

Firm finds Support Advantage with ProActive Software

Customer service" is just another pop-lar estchphrase — unless your custom-

ed to install a major new system for its 2,000 users, it also set out to find a third party help-deak package to bring

inger had previously used an in house application that Pele Van Dyke, ger of MIS administration, ded as an "electronic notebook" with nited functionality. "Basically all we do was log calls," he said. That was not going to be sufficient when the new system went on-line. Van

Dyke was looking for reporting, escala-tion and prioritization capabilities to keep better track of support calls and, he hoped, make the entire process more effirient and less expensive along the way "Any time you reduce confusion in an organization and make it more efficient there are cost savings in there," he said. After investigating a variety of pack

ages, Boshringer settled on three from which to choose. Unfortunately, in the fiup to the task, Van Dyke said. So the com pany took a step back and returned to ProActive Software, Inc., a Mountain View, Calif-based company that had pre-viously refused to submit a quote for the job because of Bochringer's tight time frame, Van Dyke said.

IS YOUR MAINFRAME **CREATING OBSTACLES INSTEAD OF OPPORTUNITIES?**



A computer system should support virtually unlimited ranications opportuni It should meet any applicat seclustivity across your entire is this system. Its massively

scalable processors provide tre mendous performance inco LO throughput and commo nicutions. No other system andles more on-line and hatch applications at the same time. No other system offers more incrementally scalable I/O handwidth. No other entern accommodates mor

time-critical, on-line applica-tions. However, with the Infinity 90 there's one thing that is less, its footprint. Upgrades are made with min mal impact to productivity and floorspace. And because you can step up perfor little at a time or all at once, you can meet any application on demand for maximum pro ductivity. Think beyond new

Think unlim-



Good match This time they struck a deal, and Boe ringer took part in the beta-test progra for ProActive's Support Advantage pack age, which pro-

vides work-flow nutomation for per With Support

Dyke said, sup port calls so into a two-person where they are

ferred to the appropriate person on the staff of near 100 support personnel. If the request for support is not answered within preset time limits, it is automatically sent to the

next person in line until som In emergency situations, the system can also call a support person's pager. That technician can then log on to Sup-

port Advantage at the nearest worksta tion and retrieve information about the problem. Support Advantage soon had notice-able results, Van Dyke said, noting that 'the backlog of calls has diminished.

While Van Dyke said he is pleased with the additional efficiency, he is still wait-ing to determine just how much money Support Advantage is saving him. Tm hoping to get some reports to d termine some metrics," Van Dyke said

noting that ProActive is still working with him to produce report modules to do just that.

Macintosh product

Micro/Touch Systems, Inc. has intro-duced Mac 'n Touch SA-14 Monitor, a high-resolution touch-screen monit med for the Macintosh.

The product can he used for kiosk, usiness, multimedis or training applications. Mac 'n Touch is composed of a

14-in. display; controller and a Mac OS driver, the company reported. The Mac 'n Touch Monitor costs \$1,485. MicroTouch Systems 55 Jonepin Road

Fasten your seat belt. Have your keys ready. Then rev up the SAS* System, the world's leading information delivery system. With OS/2° under the hood, the SAS System is ready to shift into high gear.

Take the SAS System for a spin. Start your EIS. Then

race through your most demanding decision support challenges. That's when the SAS System really cranks it out. OS/2's 32bit architecture provides the perfect engine for the industrial

strength power and flexibility of SAS software.

But pedal-tothe-metal performance is only part of the story. Support for OS/2's advanced communication makes for high-

speed exchange

between the SAS software on your desktop and the SAS System already at work in the data center. You'll get a comprehensive client/server solution that runs across your entire enterprise - sharing data and computer resources in a timely and

efficient manner. When you've got OS/2 driving the SAS System, you can be sure you're heading in the right direction. To order or to find out more about OS/2 2.1 or the SAS System, call 1 800 3-IBM-OS2. In Canada, call

1 800 465-7999. Operate at a higher level."



05 2		
WINDOWS 3.1		
. 05 2	H	
WINDOWS 3.1	WINDOWS 3.1	

Date storage

RYBS Electronics, Inc. has started ship ping Version 5.17 of AtLast Upper Memo-

This version offers easier integration and more available DOS memory. Ac-cording to the company, an additional 5K

to 30K bytes of usable conventional memory is available because the product indee full support and improvement of MS-DOS 6.0. Th continually provide maxi-

evailable DOS memory, AtLast can inde-tendently track and optimize each con-According to the company, a Smart TSR feature optimizes utilities to ensure the best use of memory space. RYBS Electronics 3109 28th St. Boulder, Colo. 8930 (302) 444-0073

APS Technologies, Inc. has started shipping Toshiba Corp.'s 213M-byte, 2%-in. ternal hard drive. any, the APS To-According to the com shibs 213 was designed for use with every Apple Computer, Inc. PowerBook, inluding the new PowerBook 165C. The APS Toshiba 213 is said to have ined Small Computer Systems Interface transfer rates as high as 1,300K

hytn/sec. It delivers an access time of 27 msec with an average seek time of 12.5 The internal version of the APS Toshi be 213 costs \$599. The external AC-only version costs \$659, and the AC/DC ver-

APS Trobu 6131 Deramus

Kansas City, Mo. 84120 (R16) 373-5800

Database menagemen

Progress Software Corp. and Q+E Soft-ware have announced that Q+E now sup-

orts the Progress relational databa Through Q+E Software products, users will now be able to access Progre

ased data via an assertment of Win-The Q+E Database Editor, the Q+E Database Library and the Q+E Multi-Link/VB are the three Q+E Software products offered with Q+E Software for

The Q+E Database Editor provides Dynamic Data Exchange and dynamic in-

rmation exchange between any Windows application or tool that supports the Progress RDBMS. A lower level, SQL-based interface to

the Progress RDBMS is offered in the Q+E Database Library. Microsoft Corp.'s Visual Basic applications are linked to more than 20 PC and

SQL databases, including Progress with the Q+E Multilink/VB. Q+E Database Editor costs \$250, Q+E Database Library and Q+E MultiLink/ VB each cost \$399.

► Progress Software 14 Oak Park Bedford, Mass, 01730

(617) 289-4000

JV Consultants has started shipping DoesDB Pro Version 4.0, a docum manager for Microsoft Corp.'s Word for

According to the company, this version allows full integration among portable,

office and network computers When users copy documents from one machine to another, the DocsDB Pro naming structure is simultaneously

erred to a new location. A database created by DocsDB Pro has categories called Subjects, Polders and Cabinets. File names of up to 255 charac-

ters in length can be assigned.
Native Word for Windows or such as File Open, File Close, File Save

and File Save As are used. Does DB Pro requires Windows Version 3.0 or higher and Word for Windows Version 2.0 or higher installed on a hard disk.

DoceDB Pro costs \$129.95. **▶** JV Consultants Marina Del Rey, Calif. 90292

(310) 827-8789

AtLast costs \$79.95.

SYNERGY FOR ENTERPRISE TAPE MANAGEMENT AUTOMATED TAPE LIBRARY MANAGEMENT SYSTEM



technologies.

AVAILABLE Site Licenses Corporate Licenses FREE 30 DAY DEMOS

PRODUCT BENEFITS OF SILO SENTRY Automatically populates newly installed robotic facilities with desired datasets.

Independently Manage Scratch Pools for manual and automated tape Ibraries.

Synchronizes the MVS catalog, the Tape Management System catalog, and the automated robotic facility CDS.

Aids in Disaster Recovery Management by coping critical production datasets to Remote Electronic Vaulting Facilities. Can reduce new hardware acquisitions, manpower requirements, and the lead time to exploit new technology.

 Provides a synergistic approach to capitalize on your current data center environment investments.

Functions and Features of Silo Sentry*

ile Sentryne from Pro-Cubed Corporation Sies Sentry¹¹ from Pro-Cubed Corporation enables users to manage resources within the Automated Tape Library System without manual Intervention. Through a process called Logical Ejection, Through a copied from the automated robotic facility to external medic, thus making the original cape volumes analogued to external medic, thus making the original cape volumes analogued to external medic in the capital cape volumes are caped to the control production datasets.

Optionally, all Logical Ejection functions

and features can be applied to the Manual Tape Library providing maximum media utilization and media conversion via exploiting new hardware and software

Multi-Volume dataset support
 Multi-File Multi-Volume dataset support

IDRC / ICRC / EDRC data compression support
 Tape to DASD and Optical Storage conversion.

Dataset Stacking and Re-Blocking facilities
 Dynamic Media Rotation facilities

· Catalog and Uncatalog support

. HSM / DMS / FDR archiving support Generic Dataset Filtering Patterns

 Electronic Data Transfer support Automated Physical Ejection . TMS / TLMS / EPIC / RMM support

Once installed, Silo Sentry enhances your Manual and Automated Tape Library Facilities with functions and features that make "LIGHTS-OUT OPERATIONS" a reality. For more information call Pro-Cubed toll-free. LOCAL (908) 583-2718

1-800-289-2238

FACTIMUE (908) 290-8082

PRO-CUBED CORPORATION 162 HIGHWAY 34 SUITE 6301 MATAWAN, NEW JERSEY 07747

Going Freelance

When it comes to creating high-impact presentations, this is the only Freelance help you'll need. Now Lotus' Freelance Graphics' comes native for OS/2; so making dazzling do-it-yourself presentations has never been faster, easier or more fun.

Index, easer or more time.

Freelance Craphics for OS'2 is the first 32-bit presentation product, so it's ready to exploit the 32-bit strengths of OS'2. Screen red-draw and file retrieval optimized for OS'2, you can pring resentations right from the Workplace Shell"-just drag and drop the presentation file object to the printer object. Multithreaded background printing even lets you print one presentation in while you start the next.

Anyone can create show-stopping graphics by choosing a presentation look from over 40 -Smart/Maters design etcs, then filling in the blanks. To make it even noise; there's an ew series of one-click shortcutes-Smart/Loos. There are also 70 chart styles in the Graph Gallery, over 500 cot cell-part images, and the Smart/Startutorial to get you going fast. And Freedance Graphics for GS2 works seamlessly with the Lotts saite of GS22 applications—with 12-27 for GS2, the two work as a single application—with 12-28 for GS2.



There's simply no better way to make great presentation visuals.

never

With all the added power of OS/2, you'll be so impressed with this Freelance, you'll want to hire it full-time. To order or to find out more about OS/2 2.1 or Lotus Freelance Graphics for OS/2, call 1 800 3-IBM-OS2. In Canada, call 1 800 465-7999.

Operate at a higher level."

been

easier.

Lewlett-Packard computer systems helped Spalding's worldwide revenue grow four times faster than the industry average

> "Our HP 3000s have taken the worry out of daily operations and future growth. They leave us free to concentrate on customer service."

> > - Bard Whete, Spalding's C10 and

Instead of investing in main frames, Spading looked for a better way to manage its growing business. Away that would make the III-5 year-old sporting goods company more responsive to customer demands around the world and sare menage at the same time. So HF developed a networked solution built around powerful and the control of the con

to changing consumer needs, and deliver products faster.
To learn more, call 1-800-637-7740, Ext. 7460 for our free video, Strategic Computing, starting some on-the-ball business leaders. It shows why you might want to rethink your company's game plan.

Think again.



PACKARD

Replication catches on, but approaches still differ

By Kim S. Nash

Hot on the heels of Sybase, Inc.'s splashy troduction of Sybase Replication Server this onth, The ASK Group, Inc.'s lagres Products vision confirmed that it will start beta-testing a similar replicator this summer, accord-

The as-vet unnumed pro grew out of an internal tool that ineres consultants have used for veral months to set up distributthan 20 U.S. customer sites, said Russ Dogovan, director of product marketing at Ingres in Alameda,

The ingres replicator is due to ship by the end of the year, he said. Meanwhile, Oracle Corp. and Informix Software, inc. have touted the built-in replication features of their latest database engines. But positioning is strictly in the

database market, said Colin White, analyst at Database Associates, a consulting firm in Morgan Hill, Calif. "What it comes down to is what works, and we just haven't seen enough yet from the newest products to decide which is the better approach," White said.

pite the hype, the concept of data replication is not new. But the tools for doing it have proved with the latest round of database upgrades from the major players. That is because users are more loudly demanding the shility to manage databases and keep changing data in sync across different geographic locations, an-

alysts said. For example, a brokerage with beadquarters in New York that makes stock trading decisions based on currency exchange rates in Lond and Tokyo would want to keep that data as cur

> pull information at regular intereach database synchronized with the others even in the event of net-work failure.

"Doing distributed database is not as easy as setting up a replica-tor," White warned. "But that is a big part of it."

Echoing the sentiments of other bservers, White noted that database vendors can go only so far in king client/server a reality for

working products and their applications have to be built and built solidly, he said. And that is the responsibility of nore than one vendor.

in a nutshell, distributed database schen let databases at two, 10 or many more sites share updated data at regular intervals. A typi cal scenario: Several local retail stores regular ly feed sales and inventory data to a corporatevel database at the retailer's beadquarters The corporate database, in turn, might send duplicate information to databases in another lo-cation, which would act as backup in case of a as a separate product, is key to distribe computing, observers agreed. A good replica-tion plan, they said, must accomplish the following important tasks:

*Duplicate and send data according to user-d

fined parameters, such as every five minut entinue to function and remember info tion and changes when system or network fall

 Synchronize data changes with databases in different locations so local users do not work with stale information. The differing approa

powerhouses illustrate the basic replication debate, according to David McGoveran, an an-alyst at Alternative Technologies, a consulting firm in Boulder Creek. Calif.

Keeping watch
Sybase's Ropication Server contains a Log
Transaction Monitor that looks over the shoulders of Sybase database users to see what changes they make to data and whether those ations should be sent to other locations

If a receiving locale is down as a result of a net work failure, for example, the Log Transacti Monitor sends the data until it is accepted. The Oracle 7 database keeps a separate table of data being modified — a snapshot — with

each row identified. Predefined changes trigger a message to the engine to send the infi mit requires that the sender and receiver to exchange data at a specified time. Which scheme is better often depends less on

he technology than on the know-how of the database administrator, McGoveran sald. Plus atthough users will probably adopt the repli read adoption of the concept will not occu. with the first release of the technology, he not-

You don't want to risk a critical application on first-generation product," he said Banvan adds

WESTERSO, MASS.

Banyan Systems, Inc. has an

nounced a new version of its net-work services for NetWare prod-

local-area network operating sys tems to share file and print ser

vices with a single log-in.

The product, called Enterprise
NetWork Services (ENS) for Net-

Ware 1.1, provides distributed di

arheduled to ship next mon

uct. It will allow users of N Inc.'s NetWare and Banyan's Vines



Next leverages NextStep with tighter Novell access to high-speed servers serverlinks By Michele Dostert

Ioon Calif Next, inc. intends to capitalize on its object-ori

ented software strategy with a new product could push the industry forward," she said.
"They're still a leading edge player, but I think
that the technology will be copied in one form that allows applications running on client machines to "borrow" objects from high-speed

The product, Portable Distributed Obje (PDO), will work with clients and servers running the NextStep operating system. But it will also shuttle objects between Next elients and Unix nervers, said Brett Bachman, director of product marketing at Next.

PDO announced at the recent Object World show here, was described as a way to allow en-terprisewide applications to tap the on-line rearces of multiple servers in real time. PDO is a leading-edge technology that larger

nor, principal analyst at Dataquest, Inc. in San "It once again shows that the inn-

inking and advanced features from Next

Next Chief Executive Officer Steve Jobs has said Next is working with Hewlett-Packard Co. and Data General Corp. to get NextStep applications to scale up from the desktop to high-speed network servers. PDO-compatible prod-ucts are expected from HP and Data General

by year's end, according to Next.

Next, which is expected to ship PDO by year's

rectory and security services and end, is not giving out any pricing info tions services to NetWare LANs. It

Prices will start at \$3,995 per serv

ough Banyan has aim

Ware file and print capability was designed to make ENS attractive to users in mixed environments. "We use NetWare, but the rest of the state uses Banyan; so we put tach files to E-mail messages and

send them to Banyan users the way," said David Russo, manage of the PC information center at the Massachusetts Registry of Motor Vehicles in Boston. "With ENS 1.1, we can not only send files direc but other state agencies can pr to our high-speed network print

ort for Novell's newty rete

IS directors get Notes help from DSSI

Systems Solutions International (DSSI) has launched a set of utilities desig

to allow database managers to perform control, auditing and reporting functions on Notes 3.0 databases. Scheduled to ship this summer, the

Replication/Reporter utilities, which e reports of Notes database activ ity, and a Design/Monitor utility that tracks changes made to the design of Notes applications and database servers. The DSSI tools are priced at \$965

"Any company that is coming out of

WESTLAKE YILLAGE, CALIF

While Lotus Development Corp.'s Notes wers end users by allowing them to build their own database applications,

aging the proliferation and quality

cations across an entire orion represents a substantial

EPS 2000' UPS: Breaking Performance Records with the Digital Power Quality" Difference.





It's like comparing a CD player to a 45 rpm taxstable. The Digital Power Quali-difference of the EPS 2000 UPS means distortion/free power vs. 'scratchy'

For 24-hour data processing, production lines, telecommunications or health care polications, nothing less than 100% online performance is acceptable. Making interruptible power for midrange systems a must.

Most conventional UPS systems will help. But they won't prevent repetitive data disasters and system crashes. That's because they fail to eliminate total harmonic distortion (THD)

All UPSe provide backup power during occasional outside power failures. The problem is everyday digital and conputer loads inside your facility distort voltage waveforms, overheat power supplies and cause damage to data assets and microcircuits.

EPS 2000' UPS: The best in THD performance-under 5%

To minimize the effects of harmonic distortion for midrange, critical leads. EPE Technologies has developed the

EPS 2000 system, a three-phase UPS available in 11kVA to 125kVA outputs.



With Digital Power Quality " microgro cessor control, it leads the industry in reduced harmonic distortion perfor mance (under 5%)—even with 100% harmonic loading.

Quiet and compact, the EPS 2000 UPS is at home in offices, computer rooms or factory floors.

Compared to competitive systems EPS 2000 UPS, one of the most efficient online UPSs available, handles the worst loads while reducing power usage.

Over 29,000 installations Over 20,000 users worldwide have

selected EPE's EPS 2000 UPS-for uninterruptible performance, support and productivity. GSA No. GS07F5316A For more information call:

1.800.344.0570 SQUARE D GROUPE SCHNEIDER

> 1660 Semir Asse Costs Mess, CA 90926 C10 557 M36 FAX (710 4347882

O1915 Square D Company Alt rights re

Notes 2.0 and moving to Notes 3.0 is look ing at re-engineering and managing their Notes applications," noted Mark Farkler. ctor of professional services at rkgroup Productivity Corp., a Notes

eller in Ook Brook III "People have a tend sees as usual. But with Version 5.0 of tes, it's going to be more like being a stabase administrator," Fackler said. While Lotus has provided dramatical

g individual databases in Notes 3.0, the DSSI tools are intended to give IS ectors a global view of all the Notes daes, on a network, said Star

loom, DSSI vice president of marks The previous lack of system adm ration tools has been "an impe in the growth of Notes, said Bro Chalstrom, president of Chalstrom Con milting Inc. in Oakland, Calif. "As Not ves towards enterprisewide comp ing. IS departments expect the reliab they got with mainframes. Notes 3.0 fixes a lot of that for Lotus. The tools are radi

cally improved, "Chalstrom said.
"Most IS departments don't have con trol over the vast majority of their Notes databases, so there is an enormous du-plication of data." Packler added.

Johnson & Higgins, Inc., a New York based insurance brokerage firm, is eval-uating the Usage/Reporter utility as part

of an effort to determine which Notes databases are actually in use "We'd like to evaluate how much jeach ase is] used in order to either overhaul them or trash them," said Ed Cat-

lett, an assistant vice president at Johnson & Higgins. base, the company has hundreds of them

read throughout its organization, he explained. The company does keep a tight control over which databases can be replicated to other departments, in particular, focusing on how mable the database is, whether it supports standard fields adopted by Johnson & Higgins and whether it will run on a laptop

In general, Fackler said, it will be particularly important for IS shops to moni-tor Notes databases once Lotus delivers a lookup capability for its DataLens drivers in Notes later this year. This cape ty will allow Notes users to access data stored in both Notes and SQL databases.

The tools to manage Notes are defitely there, but it's like mining for gold. You have to dig for them," Fackler said.

> DO YOU SELL SOLUTIONS?

800-343-6474



Your search for the perfect word processor has ended. Now the world's most preferred word processor is native for OS/2°.



how to use it. And there's no need to worry about converting

old WordPerfect files.

Other advanced features like Button Bar,"
Ruler, QuickFinder, and Grammatik all help
make the writing process smoother and more
flexible. In fact, this WordPerfect has so many
features that exploit our advanced technology, you could

say it's a perfect match.

To order or to find out more about OS/2 2.1 or

WordPerfect 5.2 for OS/2, call 1 800 3-IBM-OS2.

In Canada, call 1 800 465-7999.

Operate at a higher level.™

perfect

WordPerfect* 5.2 for OS/2 takes advantage of the strengths that separate OS/2 from other operating systems, giving you an object-oriented, easy approach to creating a funtastic looking documents.

WordPerfect S.2 lets you access powerful features right from the Workplace Shell? The new Automatic Document Detection (ADD) feature registers previous WordPerfect files on they's Workplace Shell enabled. Then just doubleclick on a data object to open a document—to print, drug and drop a data object onto the printer object. It's that easy, Advanced Workplace Shell integration means increased productivity for you. For example, multithreadbackground printing lets you send a document to the iprinter without vying up your keyboard.

WordPerfect 5.2 for OS/2 looks like other graphical versions of WordPerfect, so more people already know

ECO Carvicas

A look a

A look at how we do things

things

WordPerfect's Button Bar brings frequently used features right to your screen.

WordPerfect.

Workfunded to DOS, Windows PESECCO and WIX New are fully compatible with Workfunder S2. You can also eachange all your ASNED and S8M 300 liass S8M and OSS2 were selected subclearly and Workplace Seed and "Doznat at a Inglier level" are inclusived as intervent on Insurance Machines Corporation Workfunder is a registered statement and insurance and insurance of Workfunder Corporation 19 Workfunder and Insurance S8M and S8M 300 liass S

IBM

Unixasaurus stars in Jurassic Park

By Jean S. Booman

When industrial Light & Magio/LucasPilm Ltd. produced the special effects for the movie Ju-russic Furk; it was Unix workstations and ob-ject-oriested software programs that belped breathe life into the sharply defined images of

Director Stoven Spielberg originally planned to use robotic stand-ins for the dinosaurs of 100 million years ago. But a new generation of Unix bardware and software created convincing uter graphics, such as a herd of bi-ped di nosaurs running over hills past the film's ac-tors. That tipped the balance toward the use of more computer animation and less use of ro-

more computer animation and ress use in ro-bots, except for coxtreme close-cycle. Purrk, in-cluding prototyping of models, logan two years ago. "None of the technology to do the picture was available when we started," said Ton Wil-liams, exceptive in charge of digital production. at Industrial Light & Magin. For example, be said, "We had to sected the boundaries in

terms of animation and modeling complexity to set the wrinkles in the skin, the dirt in the skin and the movement of the skin over the bones. Butea team of 14 programmers created new oftware tools, based on the C++ object-oriented programming language, that supported the new level of digital detail, Williams said. Then, a group of 30 animators applied those software

to control the animation process. Industrial Light & Magic used Silicon Gra ics, Inc. workstations to make special effects for The Abuse and Jurantic Park. The firms

have worked together since 1967. Recently, Industrial Light & Magic and Silion Graphics created a joint venture, called Joint Environment for Digital Imaging, or JEDI, that links more than 70 Silicon Graphics workstations into a high-speed computer network [CW, May t0]. It was used for Jurassic Park and

ill prototype new effects for future films. In Jurassic Park, the Unix machines also had a cameo appearance in the movie, displaying three-dimensional weather maps and colorcoded security systems in Jurassic Park's conA new generation of Units hardware and software made Junesia Park's

The computer room on set had an Ethernet network with 17 Silicon Graphics Iris reduced instruction set computing workstations, in-cluding 11 Indigo workstations, four Crimson oriestations and two 4D/440 graphics work

"We made a live network of computers, and we kept them offsings," said Michael Backes, the film's display graphics supervisor. The achines in that off-screen computer room were tent to Industrial Light & Magic from July to Oc-

Kenan makes Windows push

As part of an overall effort to re-engineer its ex-ecutive information and decision support softvare for emerging client/server environments, (enan Trehnologies Corp. has unveiled a Win-lows version of its Acumste decision support

Currently available on a range of mainframe and minicomputer platforms, the Windows ver-sion of Acumate marks the company's first for-av into a desktop market other than OS/2.



Acumate for Windows includes a multidi-mensional database packaged with an execu-tive information system and a library of stan-

dard reports.

Data used to populate the Acumale server
can be drawn from BM's DB2, Informix Software, inc.'s Informix, The ASK Group, inc.'s ingree Products Division's Ingree, Sybane, inc.'s
Complex Complex on Products Information, Products

Division Complex Complex on Products

Total Complex Com res rrouses truston s ingres, sybase, inc.'s QL Server, Oracle Corp.'s Oracle nr Digital quipment Corp.'s Rib databases and then se-ssed using a predefined set of end-user que-

ple, Zeneca Pharmaccuticula, a division of Zeneca, Inc. in Wilmington, Del., gives iddle managers PCs and X terminals to run eries against data drawn from an ingres database running on a VAX, without giving them

the shillty to change data stored in production To accomplish this, Zenoca uses a variety of T emulation software packages on the PCs. The emulation software runs under Windows, but it's not a true window. You can't cut

and paste across applications," said Don Hobson, technical systems manager at Zeneca Pharmaceuticals, who said the Windows version of Acumate will allow him to do that. Kenan is also working on Release 13 of Acumate for high-end

servers, which last week went into beta lesting. With Release 13, information systems managers will no longer have to proactively man-age Acumate databases in addition to their existing databases. Instead, Acumate will support both static and dynamic SQL links to the database, said Brian McGill,

ent manager at Kenan. You no longer have to worry about administering the Acumate database. You'll be able to set up predefined apdate periods where the Acumate database is populated via SQL databases using any set of predefined

ultidimensional formats," McGill said. Release 13 is due this fall, McGill said. We've got one database that has seven dirows. With Release 13 of Acumate, we expect to be able to use the Windows implementation as a front end to the VAX systems," Hobson said.

By Michele Dostert

Intel announces eight products for NetWare

Intel Corp. is evidently serious about selling more than chips. Last week, the company's networking division announced eight new local-area network storage,

printing, virus protection and management products, all availworks running Novell. Inc.'s NetWare v3.11

operating system. in the network management arena. Intel's new LANDesk

Manager software al-lows administrators to manage and take inventory of desktop hardware, configuration and software.

motely control client deaktops. LAN managers can also use the product to monitor application use as well as network traffic.

Also on tap Intel also announced two optional LANDesk add-ons: Virus Protect for scheduled or on-demand scan-ning of any system on the network, and SNMP Gateway, which will work with a variety of network

Although LANDesk Manager at ows easy access to Novell's Netes not yet report into Novell's Network Management System

with NMS, but we're waiting for Novell to add a database to it where we can store the information LANDesk gathers," said Chris

Thomas, manager of technical alliances at Intel's Networking Di-

Cholces abound The company also anpounced two LAN software pack-

ages: LANspootExpress Print Ac-celerator was designed to boost printing performance on either background or dedicated workstas. And a new fax package, the NET SatisFAXtion 2.0, provides di-rect inward dialing support by inrect toward casting support of the tegrating user phone numbers with their network addresses, thus automatically routing faxons to the intended recipient. Intel also expanded its line of plug-and-play backup acrvers, which includes a processor, soft-ware and a tape drive.

LET'S ALL GIVE EXCEL A BIG HAND.

NOW, INTRODU YOU'VE BEEN

LOTUS INTRODUCES 1-2-3 RELEASE 4 FOR WINDOWS

To keep up with these changes, business people need new and better-suited tools. Lotus has responded by rethinking and recreating the spreadsheet as a tool for individuals and for workgroups. 1-2-3 Release 4 incorporates over 4.000 spreadsheet user suggestions. It's dramatically easier to learn and use than any spreadsheet in history. And it's the first spreadsheet that's actually designed to help people work



together in impressive new ways. IT'S MORE POWERFUL BUT VERY SIMPLE.

of tools and @ functions. Lotus has actually simplified the way you work in a spreadsheet. For example, Release 4

features an @ function pulldown menu to help you build spreadsheets faster. Cell copying is now a simple drag-and-drop operation. with meaningful visual feedback. And changing text and font attributes is done in one dialog box (Excel often requires three) So 1-2-3° is not only a lot

friendlier and easier to use than any other spreadsheet, it's a significant THE FIRST CONTEXT-SENSITIVE USER INTERFACE.



Release 4 actually anticipates what took and functions you'll need. Depending on what votire doing, 1-2-3 presents only the menu choices and Smarticon™ palettes appropriate to the operation at hand.

This means you won't spend time clicking through menus looking for the features.

IMMEDIATE ON-SCREEN MANIPULATION.

A Live Status Bar on screen shows the attributes of any highlighted element Automatic | | Anal MT

To make a change tlike font, size or decimal points) you just click on the appropriate section of the status bar. Then scroll up to your chosen attribute and click again

And unlike Excel, 1-2-3 R 4 includes In-Cell" Editing, so you can enter and edit any information right in the cell.

ONE-STEP CHARTING

With One-Step Charting, you can pick up all titles, data, legends and axis labels right

MERCURY SPORTS

While adding dozens of major new

advance over Microsoft* Excel in usability. features hundreds of macros and hundreds Integrated parties mady when you cal "Office express 6/31/79 Osalitying compenses products are Mil. 35 Cardwidge Partiesy Cardwidge MA(2010) Lotte 1-2-3 Amil fro Previous Creation and Lotte Memories to not reducing SD Microich Word Whetherless Warding Displayerts Microice Const. Committee Working Transfer Young last and in Cell are tradements:

CING THE ACT WAITING FOR.

from the worksheet to create a great looking chart the first time, automatically. And you can edit the chart right in your worksheet.

NAVIGATE THROUGH 3 DIMENSIONS.

Anyone who works on multiple worksheets will appreciate the new 1-2-3 Worksheet Tabs which can be labeled with real words. So you can go directly to any sheet simply by clicking on the appropriate tab.

Salborts In-Line Skates | Skis | Clothing | Shoes

And Worksheet Tab names are then incorporated into formulas. All of which helps to keep 1-2-3's unique 3D technology simple

and easy to use

DATABASE FUNCTIONS MADE EASY.

1 12 Height 14 Width 9

The 1-2-3 database now has a new completely graphical interface that makes using it easier than ever. Plus 1-2-3 provides a range of built-in tools that are powerful without

being perplexing.

1-2-3 for Windows has always had
more powerful database features than
Exect or Qualitiv Pro, and now
fires features are also exists to use.

For example, to modify or create a query, you don't generate criteria and output ranges with cryptic commands. Just bring up the Ouery Dialog Box and select the fields and records by name. Changing your query is as simple as drag-and-drop.

THE FIRST SPREADSHEET FOR WORKGROUPS.

Have you ever forgotten why you used a particular number? Or wanted to track more than one value in a cell or range? Suppose you've sent a spreadshect to a co-worker who develops a whole new version and sends &

back? How do you integrate it into your work? You use the

sion Manag

that's how. It tells you who did what when, and why they did it. It lets you save, label, track, mix, match, merge and comment on ranges worksheets or entire files. And it does it all without overwriting existing data.

If you have Lotus Notes' the workgroup benefits of the new 1-2-3 take on even greater proportions. Now different users can access and work on the same spreadsheet at the same time. Notes maintains file integrity and notifies



you of changes made by others. So you know you're using the right numbers.

I-2-3 IS BACK. AND IT'S NOT ALONE.

Packaged together with Ami Pro* 3.01.
Freelance Graphics* 2.01. ccMail™ and Lotus
Organizer.™ the new 1-2-3 completes
SmartSuite™ 2.0. An integrated suite of

top-rated Windows applications that's years ahead of any competition when it comes to an integrated desktop.

For your own live performance

visit your Lotus Authorized Reseller. Or call 1-800-TRADE UP, ext. 8982* to upgrade to 1-2-3 Release 4 for just \$119 direct from Lotus or to get your free demo disk Or, for a limited time. you can upgrade your entire destron to SmartSulte 20

from any Lotus or competitive product** and get a \$50 rebate coupon from Lotus in the SmartSuite 2.0 box.



1-2-3 Release 4

put Forestriat Newed Gophics, Card Dres. Von Perform Presentation, Adda Personnics, Conflicting Lond Produces acided 1-3-5 including L-3-5 in recent Symphony Are the Previous of Companion, Companion

Object Design, Inc. has introd et Design NetWare Londable Module (NLM) Server, an object-oriented data e for Novell, Inc. NetWare networks. According to the company, the product was designed to simplify the develop-

nent of new classes of distributed app ions. NetWare users can develop ap-ations that distribute and manage as, providing access to advanced ser-res for imaging multimedia, document

anagement and groupware.
The ObjectStore NLM Server is ac sible through an assortment of network-ing protocols, including native IPX/SPX and Transmission Control Protocol

A developer license costs \$7,500, and nd-user runtime license costs \$2,250.

►Object Design One New England Executive Park Burlington, Mass. 01803 (517) 270-9797

The Enterprise Systems Division of Ap pie Computer, Inc. has announced full support of Transmission Control Proto-cel/Internet Protocol (TCP/IP) for its Data Access Language (DAL) server soft-

According to the company, TCP/IP users can now access data on any Apple DAL-supported server from a DOS/Win-dows client or a Macintosh.

The DAL Server for MVS TCP/IP was so announced. Through TCP/IP, this ftware product provides Windows and b PCs with DAL client software cess to IBM's DB2 relational datab

Two existing products, the DAL Server for Application System/400 and the DAL server for VAX/VMS, also received exnded TCP/IP support.
Prices for the DAL Server for MVS

TCP/IP range from \$35,000 to \$50,000, \$8,000 to \$12,000 for the DAL Server for VAX/VMS and \$4,250 to \$20,000 for the DAL Server for AS/400.

►Apple Computer 20525 Mariant Ave rtino, Calif. 95014 (408) 996-1016

Cheyenne Software, Inc. has released Areserve 5.0 for NetWare-Windows Edi-

Arcserve 5.0 is client/server bac and recovery software for single-server or large multiserver Novell, Inc. NetWare

Enhancements incinde a "point-e click" Windows interface plus an im-proved one-step backup command called ick Start.

Tape cascading parallel streaming and stacker and changer support are ther features incorporated into the

Arcserve also provides an on-line stabase backup option, beterogeneous ment support, storage manage

set Technology has introduced the

ent and a file-tracking system, accordg to the company.

Pricing begins at \$395. Cheyenne Software 3 Expressway Plaza Roelsm Helohts, N.Y. 11577 (516) 484-5110

lomar Software, Inc. has announced rsion 1.1 of its On The Road software. According to the company, the software was designed to extend seamless Macintosh PowerBook connectivity to

ovell, Inc. networks. The product provides deferred printg and antomates volume remov and print speeler selection for Powerok users with Novell's NetWare 4.0 or

v3.11 servers equipped with NetWare for facintosh, the company said. Version t.1 supports NetWare 4.0, Ap-

he Computer, Inc.'s Express Modem, the towerBook 165C and Adobe Systems, ac.'s PoetScript Level 2 printer driver. On The Road Version 1.1 costs 299. ▶Palomar Software

Sutte D 2964 Oceanside Blvd. conside, Calif. 92054

(819) 721-7000 srkgroup software applicatio

NCR Corp. has introduced Processit, a et of process managem Processit was created to help users de sign, implement, execute and mana on-critical business processes, the

rm reported. To manage work flow aroughout the enterprise, Processit rovides a suite of Windows-based tools. An advanced database-oriented workow engine is employed to antomatically ute work based on a company's policies and procedures, and Processit uses sphical user interface-based tools to ment, measure and alter processes ut affecting work in progress or ex-

ting applications, the company said. A typical 30-user configuration of Proesit costsabout \$1,245 per user. N.W.R

1700 S. Patterson Blvd. ton, Ohio 45479 (613) 445-2078

Plasmon Data Systems has introduced Version 2.01 of the ReflectionManager, an tical-disc jukebox integration kit. Improved network performance and ompatibility with Windows 3.1 have sen added to this version.

According to the company, Reflection-anager now offers substantially higher a-transfer rates and access times be se of the implementation of a data ching system. Up to three single-drive kebases or one single- and one doublees can be integrated.

ReflectionManager prices start at ▶Plasmon Data Systems 1654 Centre Point Drive Milpitas, Calif, 95035

(408) 956-9400

Micro/Raven 800 high-speed, t6-bit, ex ternal disk array systems for the Quadr

According to the company, the disk ar-ray systems deliver up to 9.2M byte/sec. sustained data-transfer rates with aver age access times as fast as 4 msec. One drive of the product connects to the native Small Computer Systems interface port of the Quadra 800, while the other drive is attached to the MicroNet NuPort III SCSI-2 host adapter.

A true parallel 16-bit data path is then

The systems were designed for diskintensive applications and can be used for other applications, including file spryers, full-rate digital video and comter-aided design and manul Prices range from \$4,000 to \$14,490

MiteraNet Technology

Jewine, Calif. 92718 /7141897-0039

AT&T SYSTIMAX® SCS products are going fast.

administration.

A reliable, sophisticated patching system which facilitates the interconnection and management of high-speed premises wiring sys tems up to 155 Mbps. Easy to use and accessible with a rugged design. Features the inclustry's only IDC based patching system and provides for 1, 2, 3, or 4 pair



Uses patented pair-twist scheme to improve transmission performance over twisted pair. Exceeds EIA/TIA requirements and meets ANSI standards. Used as testing standard for Category 5.



With high performance, small size and modular design it provides maximum versatility in creating high-speed premises wiring systems. Designed to snap into any M-series modular faceplate, frame, or surface mount box. Multicolor labels assure fast and accurate installation.



For more details, call: 1 800 344-0223, ext. 3013



Communicate At Breakthrough Speeds.



Get AT&T's SYSTIMAX* Structured Cabling Systems, And Get Speeds Beyond 100 Mbps.

Over copper. Or fiber. Your network can, now have unprecedented speed and interoperability. All by installing AT&T's SYSTIMAX SRUCTURE Gabling Systems, with our HIGH-5th product family of Category 5 components. They support today's network applications and emerging technologies like ATM, up to speeds of 155 Mbps. And this total solution offers you end-to-end connectivity, maximum network compatibility and the ability to evolve your network as your future needs

change. All from a single, reliable source. ATRT 3 HGH5-5 products come with a 15-year extended product warranty, and they exceed ELA-56 Category 5 specifications. The copper cabling was created by ATRT Bell Laborationes and has become the benchmark for Category 5 standardization testing 50 find on the MATRE'S PSYSTIMAX Structured Cabling Systems can help you break through communications buriers. Call us at 1 800 3444-0223, ext. 3013. Outside the ULS: 602 233-38935.

AT&T Network Systems And Bell Laboratories. Technologies For The Real World.





Global Vision is Just the Beginning. Global Communications make Vision a Reality.

Once you find a supplier who can manage your data, bill you in one currency, speak your customer's language, and understand the technical and cultural difficulties of global business...suddenly your vision

has substance. And your job is easier. It happens, with BT^m. It happens with all communications—from engineering schematics or purchase orders, to financial transactions or halance sheets. BT's portfolio of Global Network
Services can make communications the easiest part of your business. Tell us about your challenges,
your goals. Then well know which
of our resources are best for your
business. We're doing just

that for companies throughout North America and around the world. To find out how BT makes it happen, call for our Going Further; Staying Closer brochure: 18008727654 in the U.S., or 1-8008747654 in Canada.

Going Further Staying Closer™

GLOBAL NETWORK SERVICES* - LAN INTERCONNECT - YEROCOMPERSNENG - IZM - MESSACING - TRANSACTION SERVICES - FRANCIAL TRADEG SYSTEMS - GLOBAL INTERIOR CUTSONERING FROM SHAME THE PROPERTY AND ADMINISTRATION OF THE PROPERTY AND ADMI

Internet commercial uses blossom

Videoconferencing makes use of existing infrastructure

By Joanie M. Wexler

Projects afoot to pump videoconferences across the far-reaching internet have already begun boosting user participation in stanrds-setting activities, unleashing educational opportunities and fueling the "virtual" cor

The budding services, which deliver one-or two-way videoconferences to desktop computers, include the Internet Engineering Task Force's (IETF) Multicast Backbone (nicknamed "Mbone") and the CU-SeeMe project om Corpell University in Ithaca, N.Y.

Mbone and CU-SeeMe leverage the Int expansive infrastructure so millions of users can eventually participate in meetis tures and other activities previously off-limits because of cost and time constraints. The two services deliver video through a server at the user's site or at the regional network management center connecting the site to the Interset. one, which links to Unix workstations, is

the "C-SPAN of the Interpet," said David P. Grubb, manager of computing standards and technology assessment at the University of California Lawrence Livermore National Laboratory in Livermore, Calif. Grubb is "attending" IETF standards committee meetings from his desktop computer via Moone.

Having "real users" looking over star emmittee members' aboulders and deb committee members' aboulders and detecting, for example, that the committee is putting too many functions or restrictions in a standard

could accelerate getting useful products to market, observed Dan Lynch, chairman of inop Co., a Mountain View, Calif., firm focused

n beterogeneous networking. At a distance participants can send elec-tronic mail to the meeting, and committee memers can take comments on-line.

Common touch In contrast to Moone, CU-SeeMe is more of an "everyman" service, delivering black-andwhite video to Macintosh computers equipped with CU-SeeMe software. The service is running, for example, in the National Science Foundation's Global Schoolhouse Project, an ever to allow junior high students worldwide to communicate with each other, teachers, scientists and others.

Global Schoolhouse students in California, Tennessee, Virginia and England are already CU-SeeMe is not based on multicast technol-ing—a factor impeding Mbone development. Multicast schemes allow conservation of

de-area network traffic. A sending site can Videoconferencing, page73

Service could offer small businesses access to 11,000 networks worldwide

By Gary H. Anthes WASHINGTON, D.C.

Sprint Corp. and Microelectronics and Computer Technology Corp. (MCC) have announced a joint serthe interpet.

The service consists of two lay-ers: data transport via Sprint's Transmission Con-

Protocol SprintLink network service and common user services such as electronic mail, security, directory services vices via MCC's Enter prise Integration Not-

work (EINet). Users will add a third lave consisting of indu tronic data interchange for retailing.

Sprint and MCC said the combined petwork service of fers the connectivity and tools necessary to enable an any of 11,000 net works on the globs Internet to support

such as manufactu ing and concurrent engineering For example, a purchasing agent might use the service to look up parts in an electronic catalog of annotices worldwide view images of items for purchase and order and pay for them on-line.

"This ... agreement with Sprint

abling them to partner more tively for market de-said Craig Fields, ch chief executive officer of MCC, the estin. Texas-based com

hearing last year of the proposed feder National Information

ways linking their erations with su ers and customers. By providing a st

dard for interconn SprintLink comb benefits to sma lower cost, MCC said

last week Electric Power Research Is tute (EPRI), a consortium of 700 electric power utilities, is converting its dial-up mainframe informa tem available to members ov

Service, page 73

Next step: Writing an Internet policy

and engineers and into the corporate mainstream, information systems anagers say they must create a cor-, ratewide internet policy to address such sues as security, privacy, directory ser-

es and pricing questions The first step is to decide what Inter rices users need to access and limit their

access to those services, Joseph Jesson, a or analyst at Chevron Corp., said at a recent E-mail conference Internet options include E-mail, hinary

file transfer, mailing lists, "chat" sessions, wa services and Telnet. Other issues and rechide the following:

· Socurity: Because universities have ac men to the Internet, the probability of stu dents finding an application "hole" is high. To combat this, Chevron created a "fire consisting of filters and limits to Int net access. Users should also weigh the risks of certain Internet applications, such

as E-mail and file transfer, against the risk of having the information in those applica-· Privacy: Good encryption can keep me

sages and data private, but the government wants to keep open a "trapdoor" that could Retiability: "99% reliability is fine unlessit's your message that's lost," Jesson said. One option is to train people to use the Internet for informal mail and use a private secured network for crucial traffic.

*Storage: Bocause end users have access to so much more information, such as news, data storage costs inevitably rise, said Eric Arnum, editor of the "Electronic Mail & Mi-ron Systems" remarked for cro Systems" newsletter.

·Costs: Commercial cons around \$30 per month for a single-user dial in connection to \$65,000 per year for a corporate T1 connection, so managers must ex · Cultural issues: Internet b

e largely unmonitored, and company on eyees have been known to download and are largely unm oad compromising and embarrasult material such as pornography Jesse Helms were going to get hold of son thing like this and says your company pu-lishes porn?" Arnum select.

 Service: Managers can expect a huge in-crease in help deak calls as mainstream cor porate users, unfamiliar with internet ad-dressing and services, call for help, said R



NAIL THIS TO YOUR CEO'S DOOR, NOW,

In 1993, 4th Dimension Software will deliver the only way to control all your computer—using MNN, VANVMS, UNIX and AS400 operating posters, to name just a few — no matter where they're located, from a single RS6000 or OPARCstation. We call it the Enterprise ControlNation. Once you've seen what it can do for you, we're beting you won't let us unplug our no-obligation demonstration unit.

ear CEO. Please don't hang the poor yurs who tailed this to ind, a photograph of the ad stuck to that door). It's small price to get your attention. We're 4th Dimension Software, and we've come from nowhere in a few short years to dominate data center automation and enterprise wide, distributed spensers management. Perhaps you remember how we became Computer Associated worst nightmare by converting over 600,000 jobs from CA-7 to our Job Scheduling and Production Control system.

CONTROL-M." During the April 1992 LA riots, our software ran U.S. Borax's computers without human intervention for 36 hours from their steated U.S. headquarters. And our products are used to run The United Illuminating Company's computers unattended on weekends. While other companies are only talking about enterprise-wide automation, 4D is

delivering it.

You can no longer afford to train and keep different MVS, UNIX, VMS and AS/400 experts. Our Enterprise ControlStation is client-server based and gives enterprise-wide, distributed, platform-independent control to a single operator from a single



station.
Now,
anyone can
use the 4D
Enterprise
ControlStation to
zoom in on operational problem areas

world. Not only
can you schedule
resources, correct problems
and perform restarts and reruns,

anywhere in the

but you can also simulate future events and play them back after-thefact to better understand problems. You can even create high-resolu-

> tion job documentation and color flowcharts from our SQL database.

We'd be happy to give you a no-obligation, on-site Enterprise ControlScation demonstration. Once you've seen it, you won't let us disconnect it. In fact, you might even give us permission to use the photograph of this ad, mailed to your door, in one of our future add

CALL US AV 800-347-4694 EXT.
2002 (OR 714-757-4300 PROM OUTSIDE THE UNITED STATES), TODAY, BEFORE TOUR CEO HAS MORE TO WORKEN SOUTHWAR A TRY HOLE IN HIS CHEFTE DOOR.

IIII DIMENSION SOFTWARE INC. OFFICE DOOR.

Take a slice off the price of Computerworld.

51 issues for only \$4. Now only \$42.95

See me a slice. 1 acrest your ofter of \$12.59 feet 51 mass, a sating of one \$500 of the basic subscription price of \$40.

Take a slice off the price of Computerworld.



COMPUTERWORLD

E4326-8



BUSINESS REPLY MAIL FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

PO BOX 2044 MARION OHIO 43306-2144



NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES





POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. BOX 2044 MARION, OHIO 43306-2144

Auto repair needs EDI standards fix

By Joanie M. Wexler

The birth of auto insurance claims applications that give industry players access to a common, detailed vehicle database has generated enmiasm for further electronic ties within the

Sophisticated technology has emerged to ease estimating disagreements among repair shops and aute insurance carriers, which b traditionally argued for days over costs. This

as customers are seeing improved turnaround time on their car repairs [CW, June 21]. However, incongruous electronic transactions have frustrated some service companies crough to form a standards con-

Electronic Data Interchange Standards (CIEDIS) group, said Erick Bickett, CIEDIS chairman and director of informatieu technology at Caliber Cellisieu Centers, a nationwide repair shop franchise based in Fountain Valley, Calif.

sortium called the

Collisions Industry

A key goal is to preclude the need for sepaemputers running estimating applications designed for different platforms from multiple vendors. These vendors include Automatic Data Processing, Inc.'s (ADP) Autemotive Claims Services division in San Ram

Calif. Certified Collateral Corp. in Chicago and Mitchell International in San Diego. ADP's system graphically depicts a vehicle's

use a bar-code reader to sean parts numbers into a database, and Certified Collateral's system is text-oriented. Aside from needing separate computers for these applications, repair shops must run an



other set of computers for each vendor's pro-prietary electronic data interchange (EDI) program and still another set for imaging applica-tions, Bickett said. "This could feasibly total to computers," he noted. "We want to comentire anatomy, Mitchell's allows adjusters to - cate using one machine

"ADP's application has worked well for us for estimating," said Joe Pych, information sysems team leader at The Travelers Corp. in ertford, Conn.

However, Mitchell has come up with a total loss evaluation application, called Vista, that Travelers would like to ose, be said. "We'd like them to talk to each other. Othe

wise, we'll have to rekey all our administrative data from the ADP estimating application into Vista." Mitchell said.

Setting goals
To these ends, four committees under CIEDIS' auspices have been charged with the following

· Determine business requirements and related communications needs among auto cinims

business partners. *Foster standards among now disparate aut repair EDI document formats and bring pro-

possis to the ANSI X12 EDI standards commit-· Fuel interoperability among diffe

pair estimating, management and accounting pplications rourage vendors to create multip ferm imaging systems. For example, "Ins

ance companies want to bring images to the mainframe, and nobody has an imaging packge for the mainframe yet." Blekett explained. The bottom line with CIEDIS: To gain the flex elity users bad with manual processes. While technology has put important data at users' fin-gertips, what they can do with it is limited by who interoperates with what — unlike in the days of paperwork, Bicketi said.

Service

CONTINUED FROM PAGE 71

MCC's EINet. Doug Moench, EPRI's project lend network engineer, said many utilities will connect their local-area networks via

That will allow each ntility to interactively access EPRI's news services, bulletin boards, resource alogs and documents as well as ElNet directory services and many

He said the utilities are also like ly to ose the setup for business transactions such as locating and erdering parts from a database of utility industry suppliers. EPRI is now integrating its or

ber services with MCC's ElNet directory and security services which Moench said were especially robust and sophisticated -- plus rmaties products from other vendors into a seamless suite of services for atilities.

"RINet already had some products in place that integrated varieus technologies [such as X.500 di-rectory services] and that made it very easy to integrate our core ser-

Videoconferencing

CONTINUED FROM PAGE 71

ship just one video packet to a location wishing desktops. The receiving router replicates the packet and redistributes it to the users. How-ever, with the accompliant ever, with the ecception of devices from Prote-on, Inc. in Westboro, Mass., routers today de not clude multicast software.

Market leader Cisco Systems, Inc., upon whose products many regional injernet seg-ments are based, expects to deliver the capa-bility in 12 to 18 months, said Heidi facurto,

Meanwhile, simulating what is becoming known as the "virtual corporation," a new packet video consortium of 20 companies including Compression Labe, Inc., 1BM and Sun Microsystems, Inc. is using Internet videocon ferences to actually develop Internet videocon ferencing technology, said John E. Dreseber

manager of program development at MCNC Center for Communications in Research Triangie Park, N.C., which focuses en advanced net-The consortium's aim is to put together a

guideline of standard equipment and software for using internet videoconferencing. To that end, representatives from the disparate com-panies are meeting via Mbone. However, efforts are being slowed by scarce multicast and inte-net Protocol traffic prioritization scheme

Apple adds E-mail server to open systems messaging

By James Daly CUPERTING, CALIF

With the words "open systems" on the lips of many client/server system desig ers, Apple Computer, inc. continued its move into this potentially lucrative envi-ronment last week with the introduction of two new versions of its MacX.400 el

The MacX400 Version 1.1 was d igned for enterprise networks, while se MacX.400 SD (Single Domain) is opt

ed for small organizations and workgroups that need to communicate with only one X.400 server. Both will be avail-able later this summer, Apple officials

to send messages from Macintoshes to other platforms over the internet and to recipionis on other platforms connected to X.400 networks, said Apple senior director John Nauman

Major pipeline E-mail has grown in importance in recent years largely because of its close es with such things as databases and lectronic data interchange. Some ana-

lysts have even predicted that messa-ing with E-mail will become the maeasunications pipel cations in the 1990s Apple's new E-mail server pro

Apple's new E-mail server products also include support for Transmission Control Protocol/internet Protocol (TCP/IP) and Open Systems interconnect (OSI). For instance, oustoners can run X-400 messaging applications over the Internet using their existing TCP/IP in-

Open transport
Apple's OSI transport, OSI Connector Macintosh Version 1.1, will too port for the ISO Transport protocol ast provides end-to-end counsection in ultivendor environments. It will be in-uded in MacX-600 Version I. I and will so be synthible as a stand-alone prod-

Nauman said Apple will provide adtional products for multiven wide messaging in the future.

The MacX 400 SD has a suggested r
tail price of \$2,930, while the MacX 40

server Version L.1 is priced at \$4,950. The



This is damed Notes dealtop. He uses it to access information and work quickly with people in all departments to solve problems workdorde. James clicks on the Workdorde Decrusion application to catch up with important company news. The Decrusion application to catch up with important company news.



5. Once be has the information, be clicks on the Engineering Charge Order application to request specific product changes from the plant on North Reading. He links the supporting Newsurre information to the ECO is will be easily viewed with a single click of a button.



2. But to make the sale the product, in this case a girle, that to be changed in ordinate the sale the product, in this case a girle, that to be changed in ordinate the most up-to-date countries and borders. And evidently lane is critical. The competition must already be in them pricing.



Ber lauch be opens a document from Eller is product development when it responded with the necessary changes and schoolsing information. The new set was scanned directly through Loan Nove Document Imaging from the set department. James approves the set for manufacturing.

How Lotus Notes Relea

Thousands of companies already know how Lotus Notes' helps them respond more quickly and effectively to the demands of everyday business. Now Release 3 extends that power to new dimensions.

Just watch how James Carlton, a new district manager at Global Publishing, uses Notes Release 8 to solve a major global problem in short order. See how he uses information from on-site and remote locations. From both inside the company and external sources. Across a variety of platforms. How he uses applications such as Account Tracking, Newswire, and Engineering Change Orders to get a new product developed fast. And how he creates an informal team spanning a range of departments to do it.

team spanning a range of departments to do it.
With the new Release 3, Lotus Notes now
supports all the leading GUI platforms: Windows;
OS/2: UNIX.** even Macintosh.*

Which means the award-winning workgroup power of Lotus Notes is now readily available to help virtually all networked businesses improve

Comments of Facilities Property Facilities III (Field all parties property Laboral Laboral Annual Comments and All Laboral Lab



3. He clicks on the Contonner Tracking application to learn more this costsoner. The profile includes an attached 1-3-8" operands to depth clicks the icon to open the provision to add finals the Education Resources is a very large customer that page its bills.



On the Product Tracking application, all departments are obtained have confirmed that they can next the schedule However, they've continued James to be careful about raining alcebating the follows.

James uses the Decusion database to achieve/prige their comments and thank



James' next step is to click on the Newswise database for the most up-to-date report on precisely what geographical changes will have to be made on the new globe. And just how extensive they'll be.



Wurning to record and promote the least's accomplainment, three peak uppels a presentation for sector transgement in Preclance Graphen. Then he pous the presentation in the Presentation these so everyone can see how the team rearranged the world to use a big account.

se 3 changed the world.

their performance. By accelerating business processes and helping people work together more effectively than ever before.

You'll find your favorite user-friendly features from other Lotus' applications like SmartIcons" and a status bar make Notes even easier to use.

Release 3 also features enhanced templates that are very easy to customize so you can build new applications faster and more efficiently.

But you don't have to change your world to get going on Notes. Now you can get everything you need in the Lotus Notes Starter Pack for just 8996 (SRP). It includes one Notes Server for Windows and two Notes Clients for Windows. Plus more than 25 ready-to-use applications for business processes like account management, customerservice and product development. For a free demo disk call 1400-828-7086, ed. 8923 or visit your Lotus Authorized Roseller or Lotus Business Partner.



of COLT Reviews Laboratories, Inc. Macroboth is a represent treatment of Apple Computer, Inc.

E-mail products, services multiply

tronic mail systems improved at the re-cent Electronic Mail Association con-

on international standards for in-

ing interoperability and market stition, may be apparent, but at me conference speakervoiced



tions. In a keyn speech, Richard Miller, vice pres dent at General Magic, a software d

veloper in Mountain /iew, Calif., said that today's technology ards are "well meant" but "not ite there." He added that standards

To make his point that internation approved standards are not always where the action is, Miller noted that the White House, which recently published an Internet address, is not in compliance with government requirements to use

cluding X.400 messaging. Meanwhile, vendors pushed ahead more universally integrate E-mail.

Lotus said that by the end of the year, users of the remote version of CC:Mail will be able to tap into MCI Global Messaging Services. MCI will operate a CC:Mail server on sile that connects to MCI net-works. Lotus and MCI would not reveal pricing plans.

with 10 public messaging companies, in-cluding Sprint and European Postal Telephone and Telegraph authorities, to allow CC Mail users to message one another directly across the public net-

AT&T, MCI, Belicore and other tele-comm providers demonstrated an X.500 directory pilot project for looking up names, phone numbers and E-mail adses by E-mail across their various services. To provide software interfe for the demonstrations, however, the companies had to borrow applicatious built by academicians and available on the internet. An ATAT employee said users should expect to be able to use X.500 services by around 1996.

sparately, MCI said it will begin com-ercially supporting the 1988 version of the X. 400 protocol in December. The new services relay all X. 400 message types, including Electronic Data Interchange es conforming to the X.435 sta dard. MCI currently supports the 1984 X.400 standard and said that 1984 and 1968 versions will appear as a single do-main to outside users.

Los Angeles-based Isocor introduced server software for networks of DOS-

which is based on the X.400 messaging protocol, differs from other X.400 prodnets because it does not require a Unix or high-end PC server to run the server

OSIware said its Messenger 400 mes ing software, which is based on the 1988

gust for the IBM RISC System/6000 AIX operating system. The software our ly runs on many other platforms.

The Isode Consertium, a group of 60 rendors and end users that promotes product interoperability, rele source code for the X.500 directory services. The consortium provides members with source licenses that can be nsed as delivered or as the basis for prod nets or services.

Veridtalk said it will use the X.500 pro tocol in its directory synchronizati software and that its X,400 messaging 'backbone' software now works with Lotus' CC: Mail and Microsoft's Mail client software. - Lunda Radosevich



AIX/6000 has no par. What are you driving for? Open

computing and superior price/performance? Then set your course for the most open UNIX* operating system in the field.



AIX/6000" is unquestionably open, so it will fit in with your existing

equipment and network communications links, whether they are from IBM or not. AIX/6000 complies with all relevant UNIX industry standards,



including the new DCE from OSF,"

including client/server applications.

which allow you to take advantage of a host of new software technologies,

Over 6,500 applications are par for the course with AIX/6000. Everything from application development tools to accounts receivable, from

Enterprise Networking

ed LANutil Version 1.3, an Open VMS-based management and support utility package for PCs.

Corp.'s Windows for Workgroups, Novell, inc.'s NetWare and OS/2 servers is provided. According to the company, LANutil offers a set of high-level utilities that operate networkwide and reference a sinple PC or a group of PCs.

The product can be run from any PC, rinal or batch queue, and with this version. PC text files can be edited A 10-PC license for LANutil 1.3 costs Compu-Design 217 West Central St. Natick, Mass. 01760

VAN software

BT North America, Inc. has introdu network security products and service for its Global Data Network to address the \$3 billion to \$5 billion annual loss in security breaches. The firm's Security Products Portfolio comprises four nettion, specialized consulting services and

customized security reports.

Prices vary depending on the produced and service. Security Dynamics Security. ID offers a three-year contract for 1,000 to 1,500 users for approximately \$7 per user per month. TCC Data Encryp costs approximately \$430 to \$470 per box

San Jose, Calif. 96161 Gateways, bridges, routers

per month. ► BT North America 2560 North Piret St.

Novell, Inc. has introduced its NetWare Multiprotocol Router (MPR) 2.1. This version adds source-route bridg-ing of IBM's Systems Network Architecture and NetBIOS protocols between To ken Rings. According to the com-users can design more efficient, co fective interpetworks using NetV MPR and a single PC to perform so

route bridging, routing and multiport wide-area connectivity. The NetWare Multiprotocol Plus 2.1 was also announced. This product in-cludes the same features as NetWare MPR 2.1 and offers the additional capa

bility of wide-area network connectivity The NetWare Multiprotocol Router 2.1 costs \$995, and the NetWare Multiprotocol Plus 2.1 costs \$1,495.

► Novell 122 E. 1700 South Provo. Utah 84606

(801) 429-7000

Madge Networks, Inc. has introdu Smart 16/4 Bridgenodes, a line of adapter cards designed for high-performance source-route bridging and routing with Novell, Inc.'s NetWare Multiprotos

Router (MPR) 2.1. A software-based brie

tion can be implemented using MPR and Smart 16/4 Bridgenodes, which have a source-code routing Application Specific tograted Circuit chip that supports (Ware MPR's high-speed source-re

Pricing for the Smart 16/4 Bridges

egins at \$1,045.

Madge Network: 42 Airport Pkwy.

San Jose, Calif. 95110 (408) 441-1300



Compu-Design Group, Inc. has an-

Support of multiple stacks for Digital Equipment Corp.'s Pathworks, Microsoft

see what we're driving at.

Get ahead of the game and contact your IBM marketing representative or Business Partner to find out what the AIX/6000 can do for you.

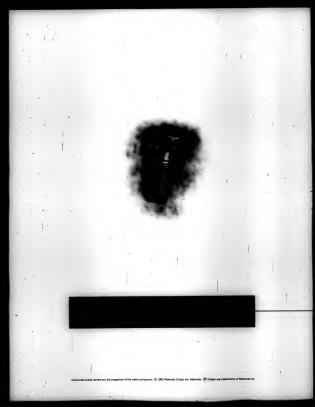
databases to CAD, And AIX/6000 also offers CICS/6000," the most popular online transaction processing (OLTP) program available, as well as Encina, an exciting new OLTP technology.

And IBM enhancements make you a big hitter off the tee with improved systems and network management, interoperability and ease of installation. With RISC System/6000's price/performance leadership, there's no handicap to your needs or your budget. Team that up with IBM's unparalleled service and

support 24 hours a day, 365 days a year and you'll



For literature call 1 800 IBM-6676, ext. 688. Because open is the only way to play.





Catalog Showcase

To place your catalog advertisement, call 800 343-6474, x 744

CODEXPRESS



1-800-870-5066

MICRO FOCUS® Software and Publications

800-551-5269

Rightsizing



SunExpress

ONE CAN BUYS AN



TELEPHONE: 200-0122-5UNX 0800 50088 08 20 61 27 01 20 21 61 61 01 0120-33-60 FAX: 200-0140-081 81 62 0120-33-60 1-800-USE-SUNX ext 54

SUPPORT YOUR ENTIRE NETWORK FROM A SINGLE LAPTOP.

The BLACK BOX* Cassing. Filled with over 6,000 prod from LANs to less drivers, mos

constitute, at the handbook of connectivity, And it is unstalled to help you find the right modests. Right now. Court on extra like 45 day strong-book par-eries, tend evaluations, and long-term waters-me-plan 2-bloom crops to students of your secreta-hopping that of the quapturest the same day. So cell us notify at 800-525-6145, and each for premary 10 to get the latent RACK 802F Cassing to grey our selector, the support of the long day you selector, the support of long day to your selector, the support of long days your selector, the support of document.



Mark Day Corps

Showcase Your Catalog



1-800-343-6474 ext 744

Take a slice off the price of Computerworld. 51 issues for only ... Now only \$42.95 See me a slice. I accept your offer of \$42.95 to \$1 issues, a untege of our \$50.00 file balor subscription price of \$40.00 to \$1.00 file.



COMPUTERWORLD

Take a slice off the price of Computerworld.



COMPUTERWORLD



BUSINESS REPLY MAIL

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

PO BOX 2044 MARION OHIO 43306-2144

ldalalladddaallaadaaldaddddaldd



BUSINESS REPLY MAIL.

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. BOX 2044 MARION, OHIO 43306-2144

Worldspan Travel's plan for single system takes flight

pan Travel Information Services shifted into high gear with its informa-tion systems overhaul earlier this month as it signed a \$100 million deal with IBM for hardware, software and services. Worldspan, which services about

11,600 travel agents worldwide and competes with such industry giants as AMR Corp.'s Sabre, plans to complete a new mainframebased system later this year

and be fully operation with it in 1984, according to George Balog, senior vice tent of operations and The company, formed in

1990, is currently owned by Delta Airlines, Northwest ines, Trans World Airo (TWA) and Abacus Dis ation Systems Pte Ltd. in Singa Since its iaunch, Worldspan has been working toward consolidating its travel

related services onto one system. It had been leasing computer services from its owners and providing travel information to two distinct customer bases. One cus-tomer set used the Pars reservation sys-tem, which belonged to Northwest and TWA, and the other used the Delta Datas As a result, Worldspan often did twice

the work it needed to do. For instance, if airfares changed, Worldspan needed to

adjust each system separately. Today, Worldspan is getting closer to its goal of one system. Earlier this year, it purchased the Para Service Partnership — the data processing and network

communications operation — from Northwest and TWA for \$25 million. It will use that system as the foundation for its new operation and include some functionality from the Delta Da

tes II environ The IBM deal inch rprise System/9000 maindevices, fiber-optic techn ogy and service. IBM will work with Worldspen to deelop the new core system. which will continue to be

ased on the IBM Transac tion Processing Facility, the 26-year-old operating envi-ronment used by the sirine ered newer technologies, including client/server, it determined that newer ms could not provide the large-

scale database management and high transaction throughput the company The Worldspan system handles up to 1,000 transactions per second on aver-age and up to "several thousand per secd"during peak vacation and travel pe-ds, Balog said.

"I think this is really a logacy issu said Brad Power, a consultant and vice Worldspan Travel, page 84

HP fills Unix gap

Midrange systems more affordable but slower

PALGALTO CALIF nce introducing the big rig of its

assince introducing the up in or in multiluser them more than a year ago Hewlett-Packard Co. has discovered that some users want only milhivant and are unwilling to pay a half-millior dollars or so for heavy equipment.

So today, HP adds six models to its Unix line of minicomputers to fill a price/performance gap between its top-of-the-line Unix Corporate Business Series 800 Unix family

At the same time, HP will cut prices be-tween 10% and 30% on all entry- and midge-level Unix minicomputers. Base prices for the six new models ange from \$50,000 to \$129,500 compared with a range of \$535,000 to \$650,000 on the Corporate Business Servers, which were introduced in May 1992 as the con-terpiece of HP's mainframe alternative

And while the new models do not apoach the performance of their more ex-maive brethren, users said the more pealing price tags could lead them to be upgrades they have been putting

At Oregon Steel Mills in Portland, Ore., for instance, system engineer Rick Kay said his company has been pushing per-formance limits on its HP Unix equipout for some time but has found the ice tags of the Corporate Bu

Now we may be able to go with one of these," be said, referring to the new mod-

Another HP user, who asked not to be entified, said the Corporate Business

Servers are too expensive and that HP was now offering a more reasonably ive and that H riced upgrade path. HP claims its Corporate Business Sys-ems line — which includes the Unix Corporate Business Servers as well as ver

sions based on HP's proprietary MPE/D operating system with Unix hooks — has Unix gap, page 86

S1 MILLION DOLLA ITS PH

Chicago-Soft, Ltd., the developer of MVS/Quick-Ref" has budgeted \$1,000,000 to invest in the discovery, development or acquisition of new MVS products with high sales potential.

Despite contrary opinions, we think the MVS marketplace is alive and well. Our MVS customer base of 2,500 sites worldwide is constantly looking for new software to leverage their investments in MVS applications. Steady sales and coninued high interest tell us that MVS may be the only practical platform to implement true enterprise computing into the next century.

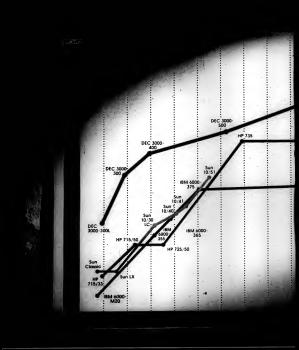
product or practical client/server approach to enterprise computing, If you or your company have recently completed or are currently we want to hear from you.

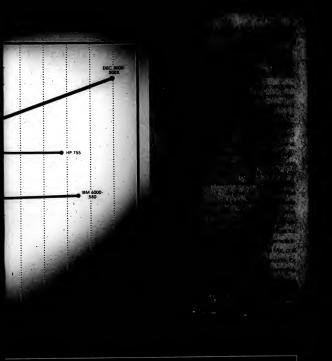
> Please contact: Art Ouirk Director, Software Search Team Chicago-Soft, Ltd. 45 Lyme Road #307

Hanover, NH 03755

45 Lyme Road # 307 . Hanoter, NH 03755 . Fax 603-643-4571 . 603-643-4002

developing a major new MVS





digital

DEC advances dates for key AXP features

By Craig Stedman

Digital Equipment Corp. is now commit ted to adding support for both volume shadowing and file journaling to the Alpha AXP version of its OpenVMS operating system this year, ahead of its original first-half 1994 schedule.

Both technologies are critical functions for commercial users wanting to build production systems based on the Alpha AXP bardware. Volume shadowing in particular is important to clastered machines, as It enables disk drives to be mirrored so that data will not be lost

in the event of a drive failure. "That's key for a production environment," said Matt Holdrege, senior network specialist at Pacifi-Care Health Systems, Inc., a Cypress, Calif., health maintenance organization that is putting in place a new VMScluster based mainly on VAX 7000s that are board-

upgradable to the Alpha bardware. While DEC already sur ports basic clustering in the new Version 1.5 of OpenVMS AXP, full-blown Alpha clusters will not be possi volume shadowing is available, added Wes Melling, program director for mid-

range computing strategies at Gartner Group, Inc., a consulting firm in Stamford, Conn.

Delivery dates DEC is now promising the shau functionality for shipment by December. The journaling capability for the company's Record Management System (RMS) file system is due out during the sur according to a delivery schedule the com-

pany announced earlier this month RMS journaling records transaction and updates of other forms of data in a separate journal file that can be used to restore actual files if a system or net-work is disrupted. Both Alpha AXP and

same journaled files in mixed-architec ture clusters, DEC said

Also expected on a relatively shortterm basis for OpenVMS is a Windows 3.1 user interface for system management applications. It would run on top of DEC's Pathworks local-area network software and enable users to manage OpenVMS

machines from PCs. A prototype Windows interface was shown at the recent Digital Equipment Computer Users Society (DECUS) spring conference in Atlanta, and DEC's goal"is to have something out within a year," said Donald Harbert, vice president of

OpenVMS engineering. "That's not a commitment, though, because we don't even know if we're going in the right direction on this," Harbert added. The first version would also not support the full base of systions now available under the company's Motif and command language inter-

faces, be said. On a longer term bas DEC is working on a new OpenVMS file system that will replace RMS. Multiple personalities will be supported, allowing it to be accessed from various non

OpenVMS operating ts. including Unix, Windows NT, Windows, DOS and Macintosh ma

The future file system will also much larger databases than RMS. DEC originally proposed a hundredfold in se, but users have told DEC they want to see a thousandfold im ment, Harbert said. "We're trying to get it bigger, but we're not sure bow we're go

ing to do that yet." Nor is DEC setting out a sh schedule for the file system at this point "It's beyond any kind of time frame that we can talk about schedules on," Harbert

Worldspan Travel

CONTINUED FROM PAGE 81

president at CSC Index, Inc. in Cam bridge, Mass., who worked with World-span when it was first baunched. "If you could develop from scratch today, you would probably opt for, say, parallel pro-cessing. But with this, what they've got in a system that works.

The IBM agreement follows another \$100 million deal that Worldspan sign with AT&T just three months ago. AT&T will provide a single nationwide network tolink Worldspan travel agents.

span will have moved the Pars operation. now based in Kantas City, Mo., and will run one contralized system from Atlanta In the meantime, it is working to help

ustomers prepare for the new platform The Pars users, who are more than baif the Worldspan customer base, will have a less difficult migration than the Delta group. But both customer seis will face change, "which is always traumatic, Balog said.

As a result, Worldspan is keeping a fo cus on the migration concerns, and a team is setting up a training program that will include on site belp at a travel

"We are compelled to give them the best service possible," Balog said.





Tandem yows to cut downtime

By Craig Stedman SOSTON

Tandem Computers, Inc. plans to bring out by the end of 1994 a range of software canabilities aimed at reducing typical downtimes on its flagship Guardian ult-tolerant computers. The company hopes to diminish downtime to 10% of current levels, in part by allowing on-line system reconfigurations

On-line reconfiguration will be provided through a new Dynamic System Configuration (DSC) package that eventually will support both IBM Systems Network Architecture (SNA) environments and pon-SNA networks, said Timothy Chou, general manager of Tandem's NonStop

Availability Initiative The DSC product will also work with local-area networks and magnetic and optical disc drives, Chon added. Also planned as

part of the availability initia-Tandem's NonStop SQL database, Transaction Manag ment Facility and its SNA esmunications Services plementation of SNA.

Tandem's move to reduce wntime comes as rival Stratus Computer, Inc. continues to work toward a commitment to running its systome at 00 00; evallability Within a couple years, we would expect we'll be close to that," said Jim Holley, Stratus' director of product mar-

keting. However, both Stratus and Tandem are still unsure of a method for extending so-called continuous or permanent avail shility to the application keyel. "That's the whole key, application availability." Holley said. "But it's a very complex topic. There's nothing which fits into a

Unix hardware, albeit with a significant

impact on application performance.

Maurice Gervais; Groupe Bull vice president of North American/Pacific

products and services, said application would run at "a ratio of 1-to-3 or 1-to-4"

under the new GCOS 6 HVX software for

the DPX/20, as compared with the native

performance on the company's DPS 6

nd 6000 small systems.

to have fault-tolerant hardware and soft ware if your application doesn't have it," noted John Nickerson, manager of computer services at Kaiser Permanente of Northern California, a Wainut Creek, Calif-based health organization.

But both Nickerson and Michael Kelly, chief information officer at the Chicago Mercantile Exchange, said the system vendor should not be saddled with sole responsibility for the application problem. "That's probably more of a man ment issue" at the user level, Kelly said.

Nothing is perfect

Kelly said he was pleased that improve em recovery capabilities will be part of Tandem's plan for reducing downtime We've been banging away at them for

five years" on that subject, he said. "I would rather have a system that has a fast recovery time than one that purports to never go down because there's no such

> Nickerson said Tandem is heading in the right direction. "We're happy with their products now, but as the realm of 24 (hour) by 7 (day) availability, any out-age of any sort is signifi-

Richard Schreiber, pres out of consulting firm ATB Associates in Welles-ley, Mass., said be views

undem's biggest hurdle as "Inteness to the market" brought on by shortcomings in its marketing. "They're a brilliant technology company," he said. However, "their marketing has been half-baked."

Tandem's new products will require the Posix-compliant version of the Guar dian operating system due out later this year, Chou said. The firm's Integrity line

cant," he said.

However, with development of the DPS 6 and 6000 processors stopped, Gervals said the emulator provides a growth path

sor applications is expected to follow in

A midrange DPX/20 Model 400 with HVS and support for 32 users costs \$53,361, plus \$5,630 for annual mainto-

Groupe Buil also expanded its DPX/20 line with the Model 130 compact desktop server and the Model 630 deskside server, priced from \$5,445 and \$27,450, respectively. The firm is also building support for the Windows NT operating system and Windows Open Services Ar chitecture into its Distributed Compu ing Model for multivendor applications







user did for some time leading up

to the problem, Yellia said. In addition to the help desk ser

er, Legent is developing a server

niques for which Legent is seeki

backup and recovery server will

recognize that it is

getting the same

thing back multiple

times when individual

end users run their in-

eremental backups

the next day. Only one

The product will create diskettes for

each server. When a

server goes down, its

diskette can be car-

ried to a server else-

where, where it will

drive the recovery

process, automatical-

ly going wherever

necessary on the net-

"If it really does the

Mills, Inc. in Chatta-

noogs, Tenn. "Anything that will allow

convaviil be saved.

intelligent expert systems

Legent recasts help desk server plans

By Gary H. Anthes

Legent Corp. has "scrapped its original concept for a help desk product — a rules-based "expert system" shown as a prototype at appeal user ore: complex," he told data

than a year ago - in favor of one that will in es nce build its own in-

Chief Technology Of-ficer Robert Yellin told mers at Legent's user conference here pany had made the wrong choice between two ap-

alp desk environment more than naches to automating problem guoses in distributed systems. Our idea was if we could just will be consolidating get a really smart person to code up the rules as to how to diagnose a lot of ind but in order for some one to troubleshoot in a problem, we could systematical ly diagnose (problems) by going through that knowledge base," ent, you're going to

The idea for Legent's "Profes-sional Help Deak Adviser" did not pan out, Yellin said, because of the difficulty of finding experts who had the required knowledge and unicate with "knowlengineers" building the sys-

Probing deeper
Now Legent is working on a prod-net that will be driven by a database of actual configurations and "events" — captured by electronic probes — that are digested in a coss called "intersection anal-

You look for things in con for patierns, for interrelationships among things that existed in every instance of a problem," Yel-lin explained. "You do a lot of matching, a lot of permutations

Yellin said the approach is an ex-ample of case-based reasoning.

and he jokingly said he hopes to se the product Deja Vu. He said the resulting "belp desk server" will become "the epicenter" of the data center. "Most of your staff growth in the 1990s will occur around the help deak because the situation out there is so

ed that gamut of in-

The belp deak serv-

er will be connected to

an array of other spe-cialized servers. Yel-

lin said, for functions

such as user adminis

tion, archiving

ent, performance

For example, the

automatically

distribution server

send software np-

dates to users, and

the results will be sent back to the

schedule server and the help desk server

We'll need some very

management sebeduling.

cation manage-

avoid dupitestion by recognizing a piece of software or data that it has already backed up. When this happens, all it has to do is log in a dicepter professionals at ectory the identity of the item to the user conference. be backed up and its source.

The scheme is intended to save "We see fewer tradi

tional operators and storage space and reduce network more systems managtraffic. For example, if the distribu ers," said a Legent custion server sends out thousands of tomer at the con copies of new PC software from a who asked not to be mainframe to departmental servnamed. "And the sysers and from there to desktops, the tems managers need s

"Customers are going through a crisis of conpectivity. They can't answer the question of erates, which notwork is not available, y the server is down why response time is bad or whether they have received the last update of application ware from the data

center. All these calls are going to be coming Into the help desk, and It's going to be a lot more complex than just figuring out what's corner of the 3270 and

asking someone to re-boot a controller," said Legent's Robert

histicated probes out in the me to ensure that I have an ar-

Syncsort software simplifies probes will have to be very de-tailed. If a PC user calls the belg mainframe-to-Unix migration deak with a problem, the help deak technician will want to see a clickby-click record of everything that

By Jean S. Bozman WDODGLIFF LAKE N &

Users who installed beta-test versions of Syncsort, Inc.'s users who matalized near-test versions of Synchot, Inc.'s Unix software in recent mouths said it eased the migration of maintrame applications to Unix workstations. Synchot, which has been selling its data-nort software to maintrame shops for 20 years, and it recently began shipping produc-tion copies of a Unix version. for distributed backup and recov-Using pattern recognition teches for which Legent is seeking ents, the backup server will

non copies or a Unix version.

Large volumes in data. — ranging from several graphyses in p to 3000 bytes or mure — may require presenting for use with some downsized Unix applications, users said. That is because the smaller Unix system cometines cannot handle the sheer volume of transactional data held in mainframe

Syncsort software was traditionally applied to batch-processing jobs that ran against large volumes of flat-file data, the users

AT&T has millions of records to process for some internal consumer marketing applications, said Ivan Hungrin, a senior software

engineer in AT&T's Consum Communications Services Department in Basking Ridge, N.J. "We die so much data that we cannot put it all into one database,

The AT&T site had used Syncsort on mainframen for four years. But in recest months, the customer billing applica-tion was moved to a Sun Microsystems, Inc. server with the data stored in local flat files. .

he said. The Synesort software, installed two months ago, was priced at about \$7,000 for the Sun server — roughly half its mainframe price, he said

Paul Zyla, a programmer/analyst at the National Marrow work to get the infor-Paul Zyla, a programmersanque, au de rescote Sultix sort-lonor Program in Minnespois, said Syncsor's Unix sort-ing software has cut end-of-month processing time in half— from two days to least han one. The program, which matches doctors and recipients for bose marrow transplants, has Sy-base, Inc. relational databases running on its Sun SYARCmation needed for rejob correctly and efficiently, it will be an station 10 and Sun 630 Unix servers. It uses the new Unix amazing success," package to sort database extracts for about 80 end-of said Pete Clark, sysmonth reports, Zyla said. tems programming manager at Olan

The Unix version of Syncsort ranges in price from \$1,000 for a single-user workstation to \$25,000 for a large Unix server, the company said. The Unix version in invaliable for Sun's Solaria, Howstati-Packard Co.'s HP/UX and IBM's AIX for RISC System

ctwork, 'Wellin said.

ehived copy of the most pertinent
data is confurred by the
data is confurred by the
data is going to be very attractive."
last winter and installed a production copy in April.

HP fills Unix gap

CONTINUED FROM PAGE 80 200 of them by the end of last year,

it has not provided updated numbers. The line was initially troubled by ship ment delays.

Last week's additions include three dual-symmetrical multiprocessor ma-chines and three uniprocessors. All six use a 96-MHz version of HP's Precision Architecture-RISC 7100 micro

The three new multiprocessor models tretch the upper ranges of the middle of HP's Unix minicomputer line by weighing in on the Transaction Performance Processing Council's TPC-A benchmark at 411 trans/sec. running an Oracle

HP claimed the new models ontper rm systems from Digital Equipment Corp., Sun Microsystems, Inc. and IBM in price/performance, it said benchmark tests showed that one of the dual-procesaor models, the H70, beats eight-proces sor systems from Sun and NCR Corp.

HP estimated TPC-A ratings for the three new uniprocessors at 200 trans/sec., said Carol Mills, general manager of HP's General Systems Dri-sion, the company's Unix minicomputer operation. That testing is not yet complete, she said.

By comparison, the remainder of the Unix line ranges from an estimated 50 trans/sec. running Oracle to 193 trans/sec. running Oracle, Mills said. Corporate business servers are rated at

The six new models follow a nome

ture HP implemented last December, when it began inbelinglesch machine in the Unix line with a letter corresponding to its number of I/O slots [CW, Dec. 14,

The uniprocessor G60, H60 and I60 have four, eight and 12 kO slots, respectively, as do the dual-processor G70, H70 and I70 boxes. The G models come standard with 32M bytes of memory and 500M rice of storage. The H and I models have 1G byte of storage, and the I models ha



If you think all client/server development tools create the tough stuff fast,

PROGRESS builds the mission-critical applications

you can bet your business on. Simply
think again. Only PROGRESS quickly SOFTWARES call 1-800-4 PROGRESS to see how.

The Application Developer's Choice for Client/Server

©1993 Process® is a regulated trademork of Process Schmitt Col

Software application packages

Applicon, Inc. has announced Bravo Ver-sion 4 Plus, mechanical design software. Enhancements and features for the roduct include Dynamic Modeling pen Software Foundation's Motif-conent user interfaces; the ability to

send information across various operating systems, including Unix and VMS, seamlessly within the Digital Equipment Corp. environment; and manufacturing ications that include improved tool noth enimation

Version 4 Plus also offers a new Varible Declaration Panel designed to make it simpler to create and manage vari-ables that drive designs. It includes 13 bot keys created for keystroke shortcuts that enable users to execute command

strings, according to the company.

Applicon's database management apdication, BravoFrame, now supports ingres, the Ingres Product Division of Ask Computer Systems, Inc.'s relational da-

BravoEdit, BravoConvert, Bravo-Review and BravoHarness are four new applications that are available with

ravo Version 4 Plus. Pricing begins at \$7,500 per seat. Applicon

4251 Plymouth Road Ann Arbor, Mich. 48106 (313) 995-6000

Generic Software, Inc. has announced Release 4 of DeskWorks for IBM's Appliation System/400.

According to the company, DeskWorks is a comprehensive spreadshoet system that offers more than 30 new features and enhancements. Instead of entering cell addresses, a new point mode allows cells and ranges of cells to be chosen by using the spreadsheet cursor movement

Graphic charts can now be displayed on printers, plotters and graphics-capa-ble workstations with a Quick Chart fea-The results of an AS/400 database file

query are returned with a new query function, and performance improve-ments such as faster spreadsheet calculation, column/row insert, deleting, sorting and printing have been added.

Desk Works is available for a onetime

license fee of \$695. ▶ Generic Softwo 986 Madison Ave.

Madison, Miss. 39110 18011853-1189

MB Solutions, Inc. bas introduced the

JCL/Cross-reference, a product that matically provides MVS users with complete documentation of production job control language (JCL). Additional storage requires gramming and data entry are not need

ed. The product supports Version 4.2 of MVS/ESA According to the company, numerous expanded JCI, functions and facilities to MVS JCL are added with MVS/ESA Ver-sion 4.2, including Nested Procedures,

Set, Include and JCL Lib statements. All of these expanded capabilities are supported by the JCL/Cross-reference Prices start at \$5,500 for MVS systems

▶ MB Solutions Suite 106

1720 S. Bellatre St. Denney, Colo. 80222 (363) 782-0178

Compowere Corp. has announced Xpediter/TSO and IMS Release 5.3. A direct connection to Comp

A direct connection to Compuware's fault-diagnostic tool MV3 Abend-Aid is also included.

According to the company, the product gives users interactive control over pro-

gram execution at the source level for diagnosing and fixing programming or-

Xpediter/TSO and IMS users will have access to extensive diagnostic inform tion provided by the link to MVS Abend-

The Xpediter/TSO and IMS 5.3 operate under MVS, MVS/ESA and MVS/XA with prices ranging from \$33,000 to \$89,000,

epending on CPU size.

Computate

31440 Northwestern High Parmington Hills, Mich. 48335 (313) 737,7300

for the best selection

Skill Dynamics, an IBM* education services company, is the one place to shop for all

your training needs. With everything from basic concepts to in-depth skills building, we've got the courses you need, and the most current, state-of-the-art technology and techniques to teach them

That's why the best and brightest have sought us out year after year: Application and systems professionals, operators, managers, end-user business professionals, and network/communications professionals

You can decide to rub elbows in instructor-led public courses. Or you can choose from private classes, comput ased courses, multimedia courses, distance learning,

technical and management conferences or seminars.

Just select the format that fits nicely. Or, let us tailor a course to your company's needs. You'll also find the IBM

branch offices and our education enters conveniently located hout the U.S. and Canada.

Plus, we've expanded our training facilities to include IBM Manufacturing & Development

If you'd like a complete catalog, or advice from a curriculum expert, give us a call: 1 800 IBM-TEACh, ext. 111. Or in Canada: 1800 661-2131.

But first, here's just a samp listing. Feel free to browse: Technical Offerings

• IBM Products & Tools · Non-IBM Products & Tools

 Application Development
 Client/Server Computing
 Hardware Service and Maintenance

 Industry-specific Applications & Emerging Concepts
Information and Interface Multi-Vendor Systems

Business Offerings

 Management Development · Professional Skills Quality

· Finance and Accounting · Business Management Market Management and

Planning
• PC Applications

Education Services Consulting

 Outsourcing
 Custom Training and Development



Just when the competition was thinking they might have a chance to catch up...

EVEREX Introduces the STEP MP II.

It wasn't long after we introduced the original Everex STEP MP that the competition began to bring out products designed to rival our high-performance multi-processor for SCO UNIX systems.

Our customers told us that they knew we still had the edge in reliability, flexibility, compatibility, and connectibility—but they were hearing that the competition could match our power. They asked if we could give the STEP MP a boost.

We did better than that. We created the Everex STEP MP II. And that II doesn't just stand for second generation. The STEP-MP II has



twice the performance of the original. Twice. And new Everex technology actually enhances our flexibility.

Does that mean that the STEP MP is obsolete? Not by a long shot. The MP can be upgraded easily to MP II specs. Only the competition's equipment is obsolete. Especially when you compare price/performance.

And the STEP MP II is just the beginning. We'll be a introducing more exciting new Everex products soon.

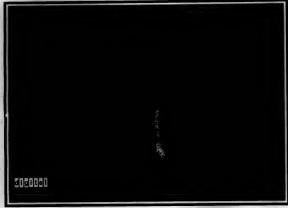
When it comes to performance and price, here's our

attitude. The competition's products haven't matched ours before, they don't match ours now, and we're not about to let them match us, much less beat us, in the future.

To get the details of the Everex STEP MP II phone 1-800-952-1556 Ext. 2



Serious Demands Demand A Serious 4GL.



Focus for OpenVMS From Information Builders. The 4GL for Serious Information Systems.

If you're facing demands that require the productivity of a 4GL, don't waste time with products that deliver only part of the solution. Now there's a single high performance, high productivity 4GL that meets all your

serious information needs. It's called FOCUS for OpenVMS, it's the world's most widely used 4GL and it can do it all.

Client/server functionality, cross-platform portability, scalability and total data access

on any platform makes FOCUS the most comprehensive productivity tool on the

market today. FOCUS also provides complete application development facilities, unsurpassed

reporting, ad hoc queries, powerful end-user tools, and desktop publishing quality output. And it's the only 4GL that provides 3GL performance. Therefore, if you're serious about your information systems, you owe it to yourself to find out more about FOCUS. For a FREE copy of a comprehensive white paper, "Meeting Your Serious Information Management Demands: What to Look for in a 4GL": or to attend

a FREE seminar... CALL ROO-969-INFO

In Canada call 1-416-364-2760

See Us At PC/Expo 6/29 - 7/1 New York, NY

IRM's Systems Network Are

ture, CICS and DB2 eavir-

Software AG aids rightsizing

rare AG of North America, Inc. last w ed an array of professional services for sers and prospects befuddled by down rightsizing, client/server, distribute

Called Spirit - for Strategic Programs for entation of Rightsized Information slow - the initiative moves Software AG ore into the world of consulting and orients ward the planning and analysis that precede eat, development or porting of an

The image that customers bave bad of us is re technical than we would like it to be," said

nathan Church, director of central services. ▶ Rightsizing Analysis and Technical Evaluation (Rate) is a consulting service to belp users anderstand the basics of rightsizing, inventors their systems assets with a view toward possi-

ble rightsizing and map out a tactical and strategic rightsizing plan. Rightsizing Applications Methodology Pro-

gram (Ramp) is an eight- to 10- week session of on-site technical and management support that extends Rate to a more detailed level. A small prototype application is delivered at the completion of the effort, which typically will cost between \$50,000 and \$85,000

▶Rightsized Environment Achievement (Reach) is a fixed-price, turnkey development of a distributed system. Rightsizing Center is a place users can go to

get hands-on experience with major platfe for distributed computing, with Unix and OS/2 es and connectivity tools from Hewlett-Packard Co., Sun Microsystems, Inc., NCR Corp., AST Research, Inc., NEC Technologies, Inc. and Digital Equipment Corp

When used for converting applications from mainframe to distributed environments, use of the center will cost between \$1,500 and \$2,500

"Spirit is a good structured way for IBM frame shops to take an evolutionary approach to right sixing their hardware and applientions," said John Logan, executive vice president at Aberdeen Group in Boston.

Except for IBM, they are the only ones to have done this from the mainframe perspective," Logan said. "If you asked Oracle to come into the data center and tell you which applica-tions should be downsized, with what tools and in an evolutionary way, they wouldn't have the slightest idea where to begin except to say Obliterate the mainframe. If you're a main frame-trained voteran, this is a great chance to open your eyes to see what the opportunities are, a try-it-before-you-buy-it approach from structively helping you adjust to the change."

Seer, IBM reveal plans for AD/Cycle technology sharing

NEWTORK IBM Programming Systems tried to pump new life into its ADCycie software development program recently when it announced plans to incorporate Seer Technologies, Inc.'s communications connectivity code into future application

Under the shared technology agreement, Seer plans to

uct 4.1 application generator into Seer's High Productivity System (HPS) application development suite. The deal is expected to fur-ther strengthen IBM's object-oritransferred between IBM and non-

IBM platforms, analysts said. In addition, Seer's middleware opents will be bundled into IBM's future AD/Platform pro ucts, IBM officials said. AD/Platform a follow-on to the AD/Cycle program, is expected to comprise a repository-based devel

eounectivity. AD/Cycle for IBM's Programming Systems unit, said AD/Platform

time elements will ship by mid-1994. A Program tems spokeswoman said the unit will introduce client server software beginning this fall The deal was also seen as a shot in the arm for Cary, N.C.based Seer, a 3-year-old, \$35 million upin-off of The First Boston Corp., whose computer-aided software engineering

layer will now permit IBM's M' CICS, MVS IMS, OS/2 and AIX of

mments to interoperate v and Windows NT, as well as S Microsystems, Inc.'s SunOS and

to generate code to non-IBM p forms," noted Gene Porte, pre dent of CASE Outlook, a Port Ore,-based CASE research firm that publishes a bimo

rwsletter by the same nar Forte said the shared technology deal accelerates IBM's ians to implement reusable code for its application devel

Seer users eye redevelopment strategies

Application Development

Seer users eye redevelopment

CONTINUED FROM PAGE 91

But Schwab's cooperative processi scheme will not last much longer. Who

the brokerage upgrades to HPS Version
5.3 later this year, Stinton said, Unix
servers will be brought in to route information throughout its trading environment.
"We need distributed computing so we
don't get blown out of the water if one of

doù't get blown out of the water if one of our databases goes down since we have to continue trading." Situton said. Atthough Schwab plans to retain its HDS mainframe to run its over trading system, Sitison said, the company is planning to officed other applications, such as its accounts psyable or accounts receivable systems, onto a Unix platform in the future.

Stinton said he expects Schwab to decide on a server piatform by the fourth quarter. The company has already decided to install 4,000 Sun Unix workstations

AD/Cycle plans

CONTINUED FROM PAGE 91

major cornerstones supporting IBM's AD/Piatform strategy. Still, the Seer/IBM alliance raises

Still, the Secr/BM alliance raises questions about the status of CASE AD/Cycle partners such as Sapiens International Corp. and KnowledgeWare, Inc. "When the AD/Cycle alliance first osme out, KnowledgeWare was the favorite

son. Seer is now being promoted almost in its place," said Peggy A. Ledvins, a program director for application de-

Topenswork
See and Tomesc,
toc. disp
unescends is jind;
program to meter
the combined
actualspipes of
See's IPS C/SE
undermork vith.
Promact's Technical
products, which
products, which
actualspipes
products
produc

gies at Meta.
Group, Inc. in
Westport, Conn.
Meanwhile, the
Seer customers
and conference alteudees noemed
more interested in
the planned enhancements for
tIPS than in the
BIM ADCycle alliance (see story
page 91). "DCE
and DME compiliance is more relicance is more relicance is more relicance is more relic-

vent to us th

Eramer, a manager of technical services at Chesebrough-Ponds USA in Trumbell, Cosn. The next generation of HPS, Version 5.3, will include a distributed computing

tion management.

HPS 5.3 is currently in bota testing and will begin shipping by the first quarter of 1994, according to Vivok Wadhws, vice

1994, according to Vivek Wadhwa, vice president and chief technology officer at Seer.

during the next three years as part of the distributed trading environment. Donan Maria Krasner, a manager of technical services at Cheesbroagh-Ponds USA in Trumbull, Conn., attended the conference on behalf of Unilever PLC, British parest of the health eare prod-

nets manufacturer Uniform's Personal Products division, which includes Chee-leveling-Front, Elizabeth and the December 1997. Elizabeth and the December 1997 of the Elizabeth and the State of Land Calvin State and the State of Land Calvin St

with the CASE environment — and Seer commitment to the Open Software Foun dation * OSF7 and Distributed Computing Environment standards — spark Krasner's interest in the application de velopment tools. "Anything that beips us get past the barriers of conflictions hardware and

"Anything that helps us get past the barriers of conflicting hardware and software environments and leads us to a more open environment is of interest to

- Thomas Hoffm



The world's #1 information technology marketplace for resellers and corporate decision makers took over the "City of Winners" for four days in May...attracting 85,000° attendes...featuring over 1,000° exhibitors... introducing thousands of new products...and making COMDEX and WINDOWS WORLD the largest technology event ever held in the Spring!

COMDEK/Sucesu-SP South America '93 April 23-27, 1912 - See Dark, Brad

COMDEX/Fall '93

● COMDEN/ComExpo Mexico'94

March 8-11, 1994 - Mexico City, Hand

NCR to supply development tool suite

velopment Environment (ADE) at the oo, showing a suite of object-oriented

ADE includes the C/C++ Workb an object-oriented programming system for Unix that belos users make the transition to writing C++ code by using fa-

Windows World

ed by Lucid and NCR. C W ch and Cobol Workbench enable proby in C or Col

eveloped by NCR.
Also included in ADE are nm

ATAT Bell Labs

Sablime and nmake will be pr 00, and the software developm Top End will be priced at \$800

Don't miss the next COMDEX—call 617-449-5554 for info by fux!

To find out more about attending or exhibiting at any of the worldwide COMDEX events, call 617-449-5554 anytime, enter Code 88, and key in your fax number-we'll fax you the latest information within 24 hours!

Wherever IT happens, it happens at COMDEX!

®COMDEN/Spring'94 Mary 23-26, 1994 - Atlanta, Goorgia USA

COMPEH/Canada '94

DO YOU SELL OUTSOURCING?

800-343-6474

Application Development

Application development tools

Softwarehouse Corp. has announce Network Program-to-Program Commiscations (NPPC) for Windows. The product is a Windows-based vision of the company's library that is us for developing network applications. Windows was designed for users who are creating Windows 3.1 or Windows for Workgroups network applications in C or C++. Available for IPX and NetBIOS networks, the product provides the same application programming interface for

both versions.
Either library (NPPC for Windows/IPX or NPPC for Windows/NetBfOS) is available for \$195 or \$395 with source code.
Both libraries (NPPC for Windows/IPX

According to the company, NPPC for Indows was designed for users who are eating Windows 3.1 or Windows for source code.

➤ Softwarehouse 326 State St. Los Altos, Calif. 94022 (415) 949-9203

Extrasensory Software has announced by Version 2.0 of both PS Error and Sex You, two products for the company's CA-Clipper development tools.

PS Error is a replacement error system, and Sez You is an environment con-

PS Error tracks both runtime errors and fatal errors, the company reported. Peatures for the product include reduced memory overhead, specialized runtime interfaces and CA-Clipper 5.2 compati-

Sez You offers new functions to report important machine information, result codes that inform users of problems, simple evaluation order for configuration settings and CA-Chpper 5.2 compati-

lity. PS Error 2.0 and Sez You 2.0 each cost

Extrasensory Software

Suite 8 4450 Murietta Ave. Sherman Oaks, Calif. 91423 (818) 981-8367

XDB Systems, Inc. has released XDB-QMT Version 3.0, a product that allows neers to develop and test QMP-compatible queries, reports and procedures in the desktop computing environment. Designed to operate with XDB, DB2 and mainframe DB2 databases, XDB-QMT-01.0 at Desert databases.

QMT 3.0 is a PC-based data query, retrieval and reporting facility. Version 3.0 offers configurable user interfaces, including a QMF-screen mode

terfaces, including a QMF-screen mode that lets users work with the same command syntax provided in mainframe QMF.

The product uses the company's Common Windowing Interface, providing features such as pull-down means, scrollable windows, push buttons and mouse support.

XDB-QMT 3.0 also interfaces with IBM's 08/2 REXX inaguage and requires an IBM PC/AT or a Personal System/2 compatible running DOS or 08/2.

XDB-QMT Version 3.0 costs \$1,200 > XDB Systems 14700 Sweitzer Lane

Laurel, Md. 20707 . (301) 317-6800

Opf. Systems, Inc. has started shipping Version 2.1 of the GUI Programming Facility (Gpf), an OS/2-based interactive point-and-click development tool designed for developing graphical user in-

From a single design, this version is said to generate native BM 08/2 2.1 Presentation Manager WorkPlace Shell and Windows 3.1 interface code, while maintaining a common look and feel across

According to the company, Gpf 2.1 automatically generates Dynamic Link Libraries and supports C and C++ com-

Gpf 2.1 runs on OS/2 Versions 2.0 or higher and requires a mouse and at least 6M bytes of available hard disk. Six megabytes of random-access memory are recommended.

A single copy of Gpf Version 2.1 costs \$1,298.

► Gpf Systems 30 Falls Road Moodus, Conn. 06469 (202) 873,3300

Station Management puts you in control of your Token Ring network.



To keep your networks running on truck, you need to have a clear view of all the activity on your network. That's why Madge is offering Workstation Manager, FREE, with every Smart Ringmode.

Workstation Manager uses Simple Network Protocol Management (SNMP) to provide comprehensive details about a workstation and adapter card configurations—all in real time, from a central console, and without disrupting the activity on your users' POs.

But that's only one way Madge helps your networks run smarter. Only Madge Smart Ringsodes have the ability to process up to four protocols simultaneously, on board-so you can

access and run more applications. And all Madge Smart Ringnodes deliver the highest levels of performance with the lowest CPU utilization-freeing more of your processing power to run those applications.

Take advantage of this mart offer. For a limited time. Madge is offering Workstation Manager (a S850 value). Are with every Smart Kingstode. Also as about our Smart Carton-20 specially priced Smart 1644 At or MC Ringstodes shipping with Workstation Manager. Madge Smart Ringstodes put you on the fast track with superior performance, and now, free workstation management software. What could be smarter? Per Smarter Token Ring management.





E-large between ter All-opin mornel Mode its folgo sign and frequency are opinions laborated of Body Sciences (1). As other specials as the proper of the registre committed following for 10th following Street Specials (4.56/19).

Why not choose the best client-server development tools?



So much hype, so many vendors - choosing the right tools can seem trickier than it really is. Just remember, industry experts and users agree: UNIFACE is the most complete, multi-platform, client-server applications development environment.

Highest user satisfaction

When Computerworld surveyed buyers of the leading Windows client-server tools, UNIFACE received the #1 overall rating.

With a data-model driven approach providing real-world productivity and object reusability, UNIFACE enables you to build complex applications quickly. Users raved to Computerworld about the high quality of applications built with UNIFACE and the speed of development. More importantly, UNIFACE was awarded the highest marks by far for vendor service and support.

Best interoperability solution

UNIFACE received the DB/EXPO '93 RealWare award (cosponsored by Intel) for Best Interoperability Business Solution of 1993. UNIFACE's 3-schema architecture ensures application interoperability across INGRES, Informix, ALLBASE/SQL, C-ISAM.

Rdb and 22 other data sources on over 100 platforms running virtually any operating system. a Best buy for 1993, productivity software

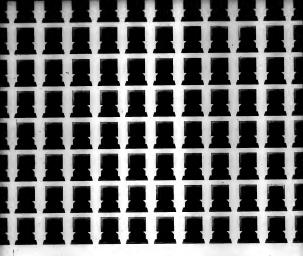
The editors and readers of Corporate Computing named "the year's breakthrough products that will make a critical difference in enterprise computing." They singled out

UNIFACE for development productivity. For example, UNIFACE supports the native look-and-feel of Windows, Motif, OPEN LOOK, Workplace Shell and character mode-without rewriting a single line of code. And INIFACE's tight links to multiple CASE tools promotes consistent data definition and modeling for large scale development projects.

The experts and users finally agree on the best client-server development strategy-the right DBMS, GUI, platform and CASE tool for the job, teamed with UNIFACE. For a free copy of our "Guide to Building Enterprise Client-Server Applications" or to attend a Uniface seminar in vour area, call 1-800-365-3608.

After all, the opinion that really matters is yours.

© 1993 Uniface B.V. UNFACE is a registered trademark of Uniface B.V. All other trademarks are the property of their resp



We've Just Created Thousands Of New Reasons Why It's A Great Time To Buy A Compaq Deskpro.

And they're all available right now. The COMPAQ
DESKPRO/i, the DESKPRO/M and a wide array of
COMPAQ Monitors. Not only have we boosted production, but we've enhanced video performance by

up to 45%. And now get great savings. Call your COMPAQ Reseller and ask about the Total System

Promotion. Or for a reseller near you call 1-800-638-8258 ext. 560. There's no reason not to.

1984 Company Companie Corporation. All Rights Record CC00PAC DCSDFBC Reported U.S. Forms and Toubrands Office. York System Princeton

Management

Mobile technologies are luring your workers onto the road by the thousands.

It's your job to help them survive in

corporation."

By Joanie M. Wexler high-speed network there. Sooner than you might think, the

The Pacific Stock Exchange's Dave Bassiohn: How do you manage people you never see? Commu-nicale, communicale, communicale.



tructure. Lest you think the whole notion is hoosy con-ider several recent studies that suggest "vis-ual technology" use is exploding. A recent tudy from The Yankse Group, for examples notes that the number of cellular network sub-certhers (voice and data) is expected to nearly touble by 1906, to 22 million.

featber-light notebook PC here, a

avant-garde work style known as the "virtual corporation" will have invaded American businesses right under our noses, thanks to new technologies that physically untether employees from organizations and let them work wherever they can be most produc-

Advocates of the fledgling concept, por ized by consultant William Davidow last year, say "virtual" businesses can save money on office space, put employees on the front lines and offer flexible work environments to valued per-sonnel. But experts caution there are draw-

For starters, business and information sys-tems managers alike need to plan for culture shock caused by quieter corridors, as well as the prospect of employee burnout resulting from round-the-clock electronic access. Then there's the added burden of creating and supporting a far-flung technology infra-

Mobile ties that bind

CONTINUED FROM PAGE 97

its major technical and organizational impact. Despite such lethargy, smart sanagers will learn to keep abreast of bewildering changes.

The best way, according to consultants and iS managers on the virtual path, is to keep in close touch with scattered employees and know when to call them back. "Successful managers will know how to differentiate when it

is appropriate to use technology jie share resources or communi-cate] and when a face-to-face meeting is called for," says Barton erg, president of Informs tion Systems Marketing, Inc. The Washington, D.C., consulting firm

ch managers, Goldenberg otes, "will roll with the punches

computer operations at the Pacific Stock Exchange, now in the early design stages of a virtual office.

That is the heart and soul behind success stories of the virtual

office," he adds.

An excellent way to create processes to make the virtual workface work is to send the boss out for a trial run, says Andy Seybold, an industry analyst and publisher of the "Outlook on Computing" newsletter. He says, "When people ask me how to prepare their staffs for the virtual workplace, I tell

them to get on a plane for a week and run their offices remotely." Keep talking Raymond Perry, vice president and chief information officer at

Avon Products, Inc., agrees that good communication is vital. With a worldwide staff of 1.7 million mo-

NO A NEW SPEED - MODELE PROFESSIONALS - WHO WILL BENNING IN NEW 5 AND CHEATE MILTIPALISM COLLAG MARKETTE PIELD SERVICE PIELD ENGINEER

agers who can't cope on employees, he adds, are ing for trouble. "They will be led into a different function,"

d, others agree that it will

take a savvy manager to cook up mobile business practices as effec-tive as a water cooler chal or a spontaneous reward lunch.

Experts say IS managers can get a big leg up by starting now to leach their staffers how to commusie in ways more in sync with a

"We're talking about reorient-ing the user with a whole new skill set. How do you manage people you never see? Communicate, ys David Eisenlohr, vice presi

bile salespeople, the New York-based beauty products maker exsplifies what the typical virtual ganization of the future may

The motivation of people is tional," Perry says, "[so] we have to get together every couple of weeks in person because people pport each other and share ex-riences. You can't do that over

one or with a conference To keep up the face-to-face conet, each Aven district manager olds regular sales meetings.

new products and learn about in-centives, Perry explains. The com-pany also keeps regional people current by daily apdating sales

Avon's Raymond Perry: Propie need to share exences, so face-to-face meetings are vital uniness, such as sales perfor-

mance data in her territory, every night to her home to jump-start her each morning," Perry explains. At systems integrator and management company NMI, Inc. in Pairfax, Va., many employees telemute from home, Chairman F. A. Dramis says. To maintain em-

ployee/organization ties, core teams meet for one hour every Monday on a conference call and talk about their two most important projects. Then, says Dramis, a former CIO

at Salomon Brothers, Inc., "we tape the conversation and put it on our voice-mail system so any employee can call in and find out the 50 most important things going on His secret to making the new sp

roach work? Make a list of things you did in the nonvirtual office, then replicate them with technolory. The trick is to "make into formal processes what was once inrmal," be says.

Virtual burden The virtual corporation pro

IS managers, in particular, with another challenge. Besides the stress caused by virtual employees, there's the additional but of researching, purchasing, in-

stalling and maintaining the technology that will support the com ications needs of wander

For example, Dramis notes that distributed computing technology ets processing and storage be lo cated anywhere in the environment. "It's up to 18 to create virtual access to these resources and a virtual computing process to link people together," he says. "18 has to create the virtual data center to

match the virtual corporation."

Such access could mean matching applications to appropriate re-mote networking technologies or itting users with portable PCs or pagers containing interfaces to cellular or packet data wire ss networks, Dra-

And because sta tionary users are nocustomed to near instant network resnse times, corp rate 18 is faced with the challenge of providing users with services as close as possible to those they can

get in the office. have to be able to give users a mirror image of what they get on their local-area networks" at headquarters, says Phillip Ev

at Perot Systems Corp., which is also constructing a virtual cuv

That's an especially big chal-inge because of the relative speed mitations of today's wide-area andwidth, especially in wireless.

And Eisenlohr also notes that building a virtual computing infra-structure includes educating end users to be more effective at trou-bleshooting technical problems

'It's downright expensive to have support resources at a facili-ty sitting idle while your sales force is out in the field 80% of the

time," be observes. The spy within

Even presuming you can patch to gether a cobesive infrastructure experts say your problems are

only beginning.

What happens, for instance, when workers and bosses are in 24-hour contact vis an electronic link? Intrusion by managem

Mark Lowenstein, a Yankee Group analyst, noted at a recent mobile computing conference that such concerns will inevitably grow. "We're entering the era of the 'no excuses' professional, who will have less guilt-free leisure time," he predi

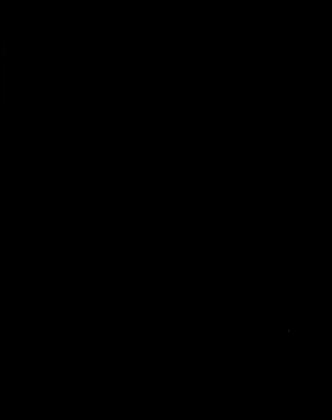
To aidestop this hurdle, Gol perg advocates a "three-times

ticularly commission-driven salespeople — that they stand to gain much more than they lose in e virtual corporation. The idea is simple, Gol

The idea is sample, toolochoory explains: "For every piece of information you request from users, give them three back." This utilimately will belp them be more successful at their jobs, he says. "For example, give them six pieces of information for one call report that are, but our to marketime and can.







WordPerfect

Introducing the word processor we developed but you designed.

If there were ever a word processor that so thoroughly surpasses your expectations, it's WordPerfect* 6.0.

Because WordPerfect 6.0 was developed to bring you more features and enhancements than you ever dreamed of asking for.

639 of them, to be precise.

Capabilities that will let you work faster. With less effort. And with a lot better results.

For starters, here are just a few examples.

21. DESKTOP PUBLISHME You don't need another program to make things look great. Not when WordPerfect brings you advanced features like drag-and-drop text and graphics, customizable borders, even contrain wann-around text!

54. QUICKFINDER Now you can index files and with one key word or phrase, locate files instantly.

277. WYSIWYE EDITIME With WordPerfect, you don't have to switch to "print preview" to see text, graphics, attributes — even headers and footers — exactly as they'll end up on paper. It's the way you can work all the time.



37. SCALABLE FORMS For the sharpest, clearest typefaces possible, WordPerfect , 6.0 displays and supports TrueType; CG Intellifont, Bitstream Speedo, and Type I font technologies.



31.5. SPREADSHEET FUNCTIONS
Now you can actually crunch numbers
while word processing. Because nearly
100 spreadsheet functions are built right
into WordPerfect 6.0.

82. coaches WordPerfect is easier than ever. But when you want to try something new, this is like having a personal instructor for quick advice or step-by-step instructions.

86. EXPANDED WINDOWING These days, nobody has the luxury of working on one thing at a time. WordPerfect 6.0 lets you open and edit up to nine documents at once.

238. BELECTABLE MERGE Once, merging data was a difficult all-or-nothing proposition. Now WordPerfect lets you easily select the records you want to merge into letters or reports.

143. ENVELOPES & BAR CODES

about as fun as licking stamps, But now you can do it automatically, even adding bar codes to speed the mail along.

256. FAX FROM YOUR DEBK Next time, don't take that hike to the fax machine. With WordPerfect and a FAXBios, Class Lill or CAS compliant fax board, you can fax right from your PC.

The other 629 new features and enhancements to WordPerfect 6.0 include its GUI/enterface, color printing and sound board support, collapsible outlines, Undo, Button Bar, Grammatik and macro conversion.

But no matter how many new features it has, one thing stays the same: it's still WordPerfect.



Which means all your present WordPerfect 5.1 files are fully compatible. And you have toll-free access to the best user support in the business. Get the full details about WordPerfect

6.0 today.

Visit your local reseller, or for your free demo disk (along with a list of all 639 features and enhancements) just call (800) 228-2720 ext. 101.

Calendar

State Information Resource Executives, Lex-

Bunt/Server '93 East, Washington, D.C., Aug. 17-

ington, Ky. (606) 231-1970.

AUG. 15-AUG. 21

JULY 11-JULY 17

ss., July 11-13 - Contact: Banyan Systems. Inc., Westboro, Mass. (506) 898-1000.

20 - Contact: CMP Conference & Exhibit ton, D.C., July 11-15 - Contact. Amintion for Artificial Intelli

ca. New York, July 12-13 — Conta Orenn, Inc., Stanford, Conn. (203) 967-

to Park, Callf. (415) 328-3123

N/Server Computing: Strategic Directions and cal Solutions. New York, July 13-13 — Conet: Ashlet Pearce, Gartner Group, Inc., Stam-

orid Bollas, Dallas, July 12-16 — Con-nia Roumania, Kacwiedge Industry cos, Inc., White Plains, N.Y. (914) 328-

ject Expe Europe '99, London, July 12-16 — mark SIGS Conference Office, New York, N.Y.

da. Toronto, July 13-15-Conta Group, Needham, Mass. (617) 449-

Windows World. Prankfurt, July 16-19 — Con-tact: World Eupo Corp., Framingham, Mass. (200) 879-6700.

JULY 18-JULY 24

ide, '99 Coolerence. Montreal, July 18-23 — stapt: Guide International Corp., Chicago, III.

Windows World. Mincico City, July 29-22 — Con-tact: World Expo Corp., Framingham, Mass.

Equipment Resources Planning Institute. Albu openous, N.M., July 22-23 — Contact: Equip

JULY 25-JULY 31

All about IRM '93. Aspen, Colo., July 26-28 — Contact: Harnett Data Systems, Rockville, Md.

AUG. 1-AUG. 7

resh 'wa Anabelm, Calif., Aug. 1-6 - Con tact: Siggraph '86 Conference Mr Clarendon Hills, IL (706) 850-7543.

tope, Santa Clara, Calif., Aug. 3-5rt: Digital Consulting, Inc., Andover, Mass.

AUG. SAUG. 14

Group, Manhasset, N.Y. (516) 562-5717.

International Networking Conference '93. S Francisco, August 17-20 — Contact: Universit ties Space Research Association, Mountain View Calif (415) 380-0317.

AUG. 29-SEPT. 4

Fed Micro 'es CD-ROM and Multimedia Conf ence and Exposition. Washington, D.C., Aug. St-Sept. 2 — Contact: Tom Lauterback, National Trade Productions, Inc., Alexandria, Va. (703) 685,8500

Structured Development Forum. Philadelphia, Aug. 31-Sept. 2 — Contact: Expirit Systems Consulting, Inc., West Chester, Pa. (215) 436-8290.

SEPT. S-SEPT. 11

uexpe '93. Lan Vegila, Sept. 9-11 — Contact: UNSC Investment Group, Newark, Calif.

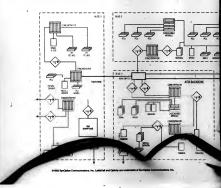
SynOptics smoothly inte into your exist

An enterprise network is one of your ess' strategic assets. And with the conarrival of new network technologies, you need a tner to help you merge and manage both the old and the new. That partner is SynOptics. Since the beginning of the intelligent

hub revolution, SynOptics has smoothed the transition to new network technologies—from network management, to the first multi-protocol hubs integrating Ethernet, Token Ring and FDDI topologies. Now SynOptics takes you one step further, with

the creation of a cohesive network fabrican underlying structure that connects and manages individual technologies through the intelligent hub. It provides high-spred network communications. And it's flexible

enough to grow as your network does, with out sacrificing your existing investment. When you demand new Asynchronous Transfer Mode (ATM) exchaology, SynOpsics has ir. LattisGell," our second-generation ATM solution, greatly increases performance both on the backbone and on the



Management

CEO vision

Renato DiPentims, the top information systems executive at the Social Security Administration, is fed up with chief executive officers who get too involved in techno-decisions and toes around terms such as Unix, Application System/400 and Ethernet. "CEOs should never say those words

That's my job," he said DiPentima's message to CEOs: "It's up

to you to provide the vision of where you want the business to go, and it's up to me to belp you get there [with enabling technology). If you don't know where you're going. I can get you there, too, like the pilot who says, 'We're lost, but we're table, Towners, Mrd., June II, 1997.

The price of quality tion systems dep

hopping on the bandwagen to get their processes certified under the ISO 9000 ality standard, but there is a price to pay: The average cost of an ISO 9000 copsultant is \$939.50 a day, according to a survey of 300 consulting firms.
Only 111 of 660 consultants covered in

national Standards Organization asrtance of checking out a consul

Furthermore, the ISO 9000 regi harge an average of \$13,128 for review ing a small organization and an avera of \$31,020 for large organizations. Since 50% of first-time applicants fail to win certification, a half-hearted effort can be

Source: National ISO 9000 Support Group, Caledo Mich. (605) Box-onfs.

Process de-engineering

Despite the hype, most new applies of work-flow software are limit groups of fewer than 50 people. The rea-son is that it is inherently difficult to define the steps in a process when it is big ger and more complex.

The solution to "de-engineeris complicated process — that is, hre it down into components - is to im pens. Use work-flow reporting softwar that monitors the work in real time an

captures the steps is chart form. Then, adjust the work-flow model on an ongo-ing basis to eliminate inefficiencies. Source: "The Delphi Workflow Report" mensiotter, M

Cashless society

Il may be time to revisit the idea of usin information technology to create a "cashless society." which could elimi-nate armed robbery for each, money laundering and tax evasion because all one and transactions would be re

ported to the govern The authors of this paper pro network of antomated teller mach and personal smart cards. The am cost of the system would be \$5 billion it would save the economy \$100 billion a

year. However, privacy and security is Source: "The cashless society it is feasible," a paper by Craig E. Pills and Laurence L. Leff, Western Rivels Uni

versity, Maconib, II., (309) 298-2303.

Setting the stage

With so many options to ch making a presentation can get sticky. message — and the audience Confactors such as corporate culti

HOW TO SELL USED EOUIPMENT. vertise in Computerwood Classifieds. They work

grates new technologies ing network.

making good time."

desktop. Plus, our complete family of LattisCell products is integrated into a powerful silicon chip set, offering you a significant cost advantage.

SynOptics integrates hardware and software, deliver-ing unparalleled capabilities to manage your network as a single-system solution. Optivity" network management are gives you the visibility to control connectivity, beidging and routing functions from a single management station, or diagnose problems that may encompass more than one element of the network. Working with SynOptiol ATM solutions. Optivity helps you manage, monitor and diagnose problems across the entire network fabric. So if you're building or managing an entery

network, get the wrinkles out with our integrated solu-tions. Call 1-800-PRO-NTWK for our Solutions Kit on ATM, including our just-released white paper "The Roadmap to ATM Networking," Because at SynOptics, we're smoothing the way for the network of the future.

SynOptics



"DISK COMPRESSION IS INHERENTLY MORE FRAGILE ... USERS OF COMPRESSION **SHOULD HAVE A COPY** OF NORTON UTILITIES 7.0."

PC Week - May 10, 1993

The new compression technology can put you in a squeeze. You wanted the efficiency, but now you're worried about losing data Here's some news that might help you relax. No

other single product gives you the complete compressed data protection of Norton Utilities® 7.0. It's the only utility specifically designed to

recover data from DOS 6.0 DoubleSpace. Stacker and SuperStor compressed drives. Only with our Speed Disk® feature can you truly defragment the drives, making your recovery a fast, painless process,

You also get the Norton Disk Doctor," with its nine automated repair functions specific to compressed drives. Plus the new Norton Diagnostics, which analyzes and tests all vital system components,

including memory, video, CPU, system boards, communication ports keyboard, mouse and more You can't put a price on peace of mind. But we'll try. Take advantage of the offer below and

discover the ultimate security of Norton Utilities 7.0. It just might

Purchase DOS 6.0 and receive Norton Utilities 7.0 for only \$99.00.* Look for specially marked packages at your local dealer, or order direct by calling 1-800-453-1062 ext. AP91. Users of any previous version of Norton Utilities can upgrade to 7.0 for only \$49.00 by calling the toll-free number above.

get you out of a tight spot.

of of purchase for new and emissing DOS 6.0 owners. Suggested retail price in U.S. dollars plan shipping and applicable tons. Act last, Valid in the U.S. and Chands only. For more indomation in Europe, call 37-17-30111. In National, call 51-2 879-6077. In Car U.S., call 466-52-3070. The Northe Utilities, Northo this Declar and Spined Disk are registered transferance of Spinanter Copyright. ers. Compatible with Windows 3.0 and 3.1, DOS 3.3 and highe

Joseph Maglitta

Paper slide!

It was a hazy, hot and humid New England morning in August 1962. I arrived at my suburban Boston office early to finish writing an important report. A cup of s teaming coffee in hand, I settled down

to work About 7:15 a.m., the lights flickered, and my terminal screen froze. "Must be too many people running their air condi-tioners at once," I thought. Irritated, I

slapped the side of my terminal. That didn't work, so I pushed my chair back, got down on my hands and knees and reached under my deak. My systems manager had told me that the quickest way to unfreeze a session is to simply unplug the power cord and plug it back in again. On the way back up, I straightened too quickly, banging my head against the erside of the desk. The next moment,

my world turned dark. Upon awakening, I realized my predicament: Somehow, when I banged my head on my desk, the huge piles of reports, apreadabeets, annual reports, contact lists, newsletters and other com ter printouts on and around my desk had toppled onto the floor, completely ering me. I was buried under tons of

paper in my office - and suffocating Panicked, I flailed my arms, but that only made things worse. A slick, shifting wall of memos, software manuals, employee handbooks, competitive reports, sales summaries, conference proceedings and other documents pressed into my face and chest. My God, I thought, I'm

going to choke to death here at my deak! "Help!" I yelled feebly, but no sound came out. Heavy layers of newspapers and magazines muffled my cries. I tried to rock back and forth to dislodge the pa-per wall that crushed my head and chest.

ut it was no use. I was paralyzed. Lying back, I gasped for breath, curs ing myself for oot heeding the earlier warnings. How dumb I was! How many times had my boss asked me, begged me, ordered me to toss out anything I didn't

Richard J. Switzky is the new senior vice president of technology and opera-tions at Metropolitan Financial Corp. in Minneapolis. At his new post, the for-mer senior vice president and manager ol operations support services at Minne-apolis-based First Bank Systems will be sible for management informs

ed. On her last visit, she had remarked:

need. On ner task vast, see near research Betterhope the fire department does come through here. They'll take you away." If only they'd show up now! Funny, I mused — a dozen years ago when I started in this business, people sed to joke that we'd have paperiess athrooms before we had paperless of fices. How right they were! Time passed. Wild thoughts began to flood my mind. A phrase from a busines course I'd taken years ago began to haunt me: "When in doubt, throw it out

Delirious, I imagined The Super Marie

And even more miraculously, the telem line was still plugged in

Slowly, painfully, I twisted my wrist to pry open the cover. Because of the treus crush of paper, I could only open the top halfway. But that was

anks to the easy, menu

face, I was able to log on quickly. The sy-tem hummed and beeped comfortingly was all set to start the E-mail program

a database specialist who looked like a Macintosh trash can icon with head, arms and legs. This paper-eating creight, splitting out a nice stack of neatly sbeled floppy disks.

As I became groupy from lack of ex-en, my hand brushed against a cool, ard object. Struggling back to consciousness, my spirit soared. My laptopi It must have gotten knocked off my desk and pushed noder my chair during the paper alide — within usable range!

est Virginia University Hospital in premotown, W. Vu., has a new distribut-

rstems operations analyst. ary B. Wise, who was formerly se ing AMS, recently assumed the hospital



J. Placher Jr. is newly in ace as senior vice pre-ent and chief informaon officer at The CIT roup. Fischer joined \$18 bil

Damn it!, I acreamed inside. This is no me for system hygiene! I'm suffochting! Furiously, I attempted to delete the sange. But it was no use; I know what

message. But it was no use; know what had to be done. With a groam, I called up my personal directory, in the dim grey light, twisted oo my side, I began skwy; systematically seaming each of the hur dreds of on-line files. Sead. Debte. Exe-cute. Read. Delete. Execute. After what seemed like days, I reach the bottom of my directory and clacks back to DOS. I never thought I'd be so

nt holding of Japan's Dai-Ichi Kangyo nk Ltd. and New York-based Chemics anking Corp. — in 1992 as vice presi-ent of business applications develop-

Prior to that, Pischer served as vice president of technology and strat services at the New York Stock

ewis B. Redd, formerly senior vice dent at First Data Corp., is newly on ard as partner in Ernst & Young's Al-nta-based health cure practice. brings some 14 years of he

happy to see a C prompt! Suddenly, I fe a new strength surge through my body In a flash, I called up the main menu, invoked E-mail and tapped out a terse no to our company's help deak.

to our company s hetp desk.

Buried in paper at desk. Cabicle
near men's recon. Help!

I hit SEND and slumped back, exhi
ed. At that moment, the whole pile sh

ed. A massive word processing manhal rammed into my ribeage, making it ever harder to breathe. Please God. I prayed, just let me hang on a little longer. Soon offer I launed back into bleckman. after, I lapsed back into bis renched back to er

by a loud BEEP, New mail! Pain rippe through my hand as I reached for the top. In the half-light, I read the glows words that made my heart leap for je Have contacted building service

elp coming. Hang on. By now I could barely feel my typ nger. Somehow i managed to peck out

God blens you, IS. As I lapsed back in

ess, a joyous thought spread over me "I'm saved!"

Announcer: This tucky victim spent the next 90 minutes recovering in the company cafeteria. After three cups of coffee, a glazed chocolate donut and a walk around the building, he went back

to work with no ill effe Thanks to the crack efforts of high trained IS professionals, serious injury to the individual or business was avoid

ed. Others might not be so lacky. If you know of any dangerous paper buildups in your own firm, don't wait for

disaster to come along. Actively seek out vital information and put it on-line. Your sers and management will thank you. But don't stop there. To protect again serious on-line "data slides," teach your staff and users to weed out and purge any information that isn't absolutely vital for the functioning of your business. Insist that people regularly clean out their own flies and directories. While you're at it, campaign against just he mail. This out hear simple steps could mean

Taking these simple ste the difference between life and death for aybe even your job.

We'll be back next week with anoth Real Office Drama. Until then, remem-ber: Real IS heroes know when to put ta on-line and when to take it off.

recovering fire hazard.

his new post, including an 11-year attnt as a consultant at Anderson Consulting developing strategic and IS plans for hos

utive director of RESNA, a ngton, D.C.-b ary and

WHEN REMOTE ACCESS PRODUCTS WERE TESTED IN THE ARIZONA DESERT, GUESS WHO HAD THE HOTTEST SOLUTION?

The test was part of a comprehensive analysis of remote network access solutions done by Corporate Computing. They packed up nine dial-in server products and sent a technician out to do some real field testing-in the town of Sedona,

Arizona, pop. 7940. He dialed in to the ZD Labs LAN in Foster City, California, And when he logged off, he had a winner: Remote LAN Node" (RLN") from DCA"—a unique software solution that lets up to 16 remote users dial in at once and function just like locally connected PCs.



RLN PROVED IT COULD

We'll let the article do the talking, "The best product was Remote LAN Node--a software solution that acts like a multiprotocol router when installed on a PC on a LAN

The magazine went on to say, "Our winner, DCA's RLN, stood out for its capability to handle multiple communi-cations protocols," commenting that "it won hands-down on flexibility, allowing our remote users to connect to both IPX and IP servers in the same call."

All in all, the article concluded, if you're looking for versatility.
"None of the other units we

tested came close."

Remote LAN Nod dends the full capability the network to remote

users, allowing them to function as true remote nodes.

RLN is both protocol- and applicationtransparent. So you can access any network protocol, such as IPX/SPX (Novell SPP/IPC (Banyan*), NetBEUI (Microsoft*) and TCP/IP-or any interconnected combination. And, as Corporate Computing pointed out, you can access them

simultaneously You only dedicate one PC as a comm server for 16 concurrent users. And RLN offers three levels of configurable security, including the industry's first Remote Security Adapter.

We've quoted lot. But we'd like you to ee more than just a few solated sentences. So call us, and we'll send you a reprint of the article. We'll also send an informative booklet, "Just Like Being There-A Guide

To Remote Network Access." And finally, we'll let you make the same sort of test Corporate Computing did. We'll send a free copy of RLN client software, so you can dial in to our LAN Lab server and

udge for yourself.
You won't have to go to the desert. Or even leave your office. But you'll find your-self in a whole new world.

1-800-348-3221, ext. 46E*

THE FREEDOM TO COMMUNICATE



SEE US AT PC EXPO BOOTH #3360.

The CW Guide to Mobile Computing

When you outfit your staff with portables, mobility takes on a life of its own. Before long, you'll have new security and networking issues to deal with, as well as a whole host of niniature technologies to explore.

nyone who has armed users with portable computers should know the monster they've created. Soon you get requests for links to elec-tronic mail; then it's personal information management software. Then they want fax modems,

faster downloads, on-line access to the local-area network it's enough to make you wish the little critters were never in-But these requests aren't easily ignored because soon they're coming not just from the users but from the head of sales or,

heaven forbid, from the chief information officer himself. That's because many benefits of mobile computing go straight to the heart of COMPETITION. The smartest companies are examining mobile computing "for the competitive advantage it will give them," says Greg Pel-

legrino at American Management Systems, Inc. in Roanoke, Va. a high-technology consulting firm. What's dangerous is that this market is never short on gadgetry. "Vendors show up with their latest feature, and firms get wowed without looking at how it can be meaningfully applied,"

says Barton Goldenberg, president of Information Systems Marketing, Inc. in Washington, D.C. "The need to establish a mobile computing environment should be market-driven, not technology-driven." With that in mind, our guide will lead you through the issues

of building mobile computing architectures, from the latest hardware features to remote-access techniques to what users are saying about the notebooks they've already bought.









Is there anything your mainfra

Once upon a time, mainframes and networks didn't get along. They were so different, they feared each other. But now, with the upswing in downsizing, client/server and PC networks, mutual cooperation is in order. So you're probably asking: "How can I leverage my investment in mainframe applications and data to benefit my network clients?" Which is tough enough to say, let alone do.

We have a simple suggestion: let your big strong mainframes help
your smaller networks with

NetWare for SAA. NetWare

All Netll products with supplied to pour before the product on the years to come. They shop in our bear with, NetWare for SAA integrates mainframe and NetWare environments, giving DOS,

me can do to help your network?

Windows, Macintosh and OS/2 network clients smooth access to mainframe and AS/400 applications. Including databases and E-mail. Yet it allows you to apply mainframe system management tools (like NetView) to the network. With NetWare for SAA, a mainframe can distribute software to your networks and even serve as an archive to ensure network data integrity. If you have a NetWare environment, NetWare for SAA brings the power of the mainframe to users who need it. And finally, everyone will live happily ever after.

Call us at 1-800-554-4446 for more information.

NOVELL. The Past, Present, and Future of Network Computing.



Now you can have the most powerful network-to-host solution.

Get both NetWare for SAA™ and the best client software-IRMA" WorkStation for Windows, OS/2, .DOS. and Mac-from one company: DCA. The only place to get singlesource training and support for the finest network-to-host solution.

IRMA WorkStation software will greatly enhance your NetWare for SAA gateway by providing ease-of-use and client server development tools and a similar interface across four platforms. Call 1-800-348-3221, ext. 49X, for limited-time special pricing for the NetWare for SAA/IRMA Work-Station solution.

THE FREEDOM

The CW Guide to Mobile Computing

Beyond the notebook

AFTER YOU BUY

By Stephen Rood

on onbe for that matter. No, it runs

an executive or a salespers hand an executive or a satespersion a notebook, you've opened the floodgates. "If you give somebody a mobile com-puter, the next thing they ask is, What clue can I do?" says Andy Seybold, pub-lisher of the "Outlook on Computing"

And for good reason. The execu who can access electronic mail faster or the salesperson who can deliver an ordfaster is a contributor to the bottom line. [We had to] address this technology



first before our competitors did," says William O. Bauserman, vice preside

and director of MIS at O'Sullivan Corp., a facturer of soft plastics in Wine ter, Vs. The company is in the beginning stages of outfitting its 45-member sol force with notebooks that dial into the local-area network server to access updat ed inventory data and place orders e

topics these days in terms of setting up a ing to a recent Porrester Research, Inc. ort, network vendors offering mobile LAN solutions will see revenue increase

in mobile LAN access to two factors: the move to client/server (and the accompanying demand to access inform set systems) and the increase in LAN

One of the most common rea establishing remote LAN access is E-mail. At MCA/Linivernal Studies, a "reste LAN" was built to allow division ex ole Computer, Inc. LocalTalk LAN as Apple Computer, Inc. Locus nuss accu-well as corporate financial information downloaded from an IBM 3000 and Appli-cation System/400. Each executive uses an Apple PowerBook equipped with a B.6K or 14.4K hit/sec. modem.

But even with just 10 to 15 peop ng in, MCA/Universal has already tangled with some of the issu dysts say will hit any informs og security and monitoring use to

a throughput of 250K bit/sec. It plans to switch to Ethernet-based NetModem/Es, also from Shivs, to achieve Ethernet's 10M bit/sec. throughput, according to Thes Hansen, technical consultant at the

company.

But an even bigger concern with dialup access is security. The very first decision you must make when providing LAN
necess. Seybold says, is: "Do you put a
modem on everyone's deak or do you put and let people go in through the server? Either way, he says, there are security concerns and, in the latter case, a lot of

In most cases, current security needs to be beefed up, Seybold says. The most common techniques are dial-back where the modem calls back the person arying levels of password protectic lansen relies on the user ID and pa-rord features of AppleTalk Remote

Rood is a consultant based in Ospining, N.Y. LAN AVALANCHE

The CW Guide to Mobile Computing

cess. However, it is not compatible with MCA/Universal's primary security sys-tem. Datalock, which resides on the m, Datalock, which ree frame systems.

urds. At Rochester, N.Y-based Bausch

Phillips also limits the information no



ent Corp.'s CC:Mail and report distrition to a staff of 40 sales representa-

In some cases, it's not enough for more to just download files from the LAN; they ed in apprate as a full-functioning ie, as if they were in the office. This s sprung the lock on a new type of LAN ge 116).

With remote node access, users are full-functioning nodes on the LAN. With the more traditional "remote control".

According to Forrester, new software is emerging that was specifically designed to run in a remote node environment, including mail, file transfer and application software. Examples include

Notes, CC:Mail Remote, Traveling Soft ware, Inc.'s Laplink and Xcellenet, Inc.'s

ntory information and a means to pro-as orders of liquor sales to stores and staurants, says Mike Mulligan, presi-

RemoteWare provides an easy-to-use front end as well as connectivity to the server. "The system helps the salespeople throughout the day as they call or various accounts and process orders di

For example, a salesperson for a res-taurant can work with the owner to come wase will be evaluable for did en in this light, mobile computing perging technology with a pictho wissues to consider. But while m

continue to create knything but an

Where wireless fits in



Network clients can share MVS and VM resources.

Feeling bogged down? Are your LAN printers backlogged and your server disks swamped?

There is an answer.

Choose IBM's newest LAN Resource Extension and Services/MVS product or the popular VM version. Both let Novell® NetWare® clients:

- ► Share fast mainframe
- ▶ Use existing mainframe DASD
- ▶ Do high-speed data transfers

printers

Transparently. Work the same, use the 'frame.

Ask your IBM marketing representative

for details. Or dial:

1-800-IBM-Call

(Ask for Dept. S61)



You can integrate enterprisewide data.

Corporate data is here, there and everywhere. In this format and that. On this platform and that, Can you pull it all together into an enterprisewide solution?

Yes, with object-oriented ENFIN™ and EASEL Workbench®. Boost developer productivity. Deliver crossplatform, enterprise client/server solutions. Reap all the benefits of real OO development.

After all, success belongs to the enterprising.

For more information, call

617-221-3000.

The CW Guide to Mobile Computing

Making sense of features

WHAT'S IN THE BOX

By Keith Richard Aleshire

cel at marketing new gudgetr But with prices 30% to 40 more than those of compara bie desktop models, you cer-tainly don't want to fall for the

c are not only more features but e-than-four-pound category (see

Of the lot, notebook com Of the lot, notebook computers are ealing the show at a slim four to seven sunds. Subnotebooks — at just under ar pounds —eliminate the built in flop-drive, have smaller keyboards and re-sire you to carry an external drive or a cable and software to transfer files.

Aleshire is an independent author and writer ne well as owner of Minneapolis-based Compo er Consumer Services, Inc.

ance the majority of people still one notebooks, we've outlined the tures you should be aware of and how

ereen possibilities at notabook screens today use be in government of the control of the ory life. If your neers will ever nee

Most LCDs use passive-matrix dis ays, where each dot, or pixel, on the reen shares electrodes with off te. Because of this sharing, pass screens can't keep up with the movem of the mouse pointer in Windows, ca ing it to blur or "disappear" if you me it quickly, reappearing wherever it sta

screens (also known as a thin-film tranor or TFT) have a separate transistor

HOW SMALL CAN YOU GET?



ld service person with data entry

The CW Guide to Mobile Computing





A mainframe can back up your network data.

Leverage is the name of the game. Wouldn't it be great if you could leverage your mainframe storage capacity and operations skills to safeguard your valuable network data? Non-disruptively?

With ADSTAR" Distributed Storage Manager, data under NetWare and selected desktop operating systems can be backed up or archived to your MVS/ESA- or VM/ESA- mainframe.

Automatically, or on command. Want to know more? Call

1-800-IBMCALL and ask for Dept. S63.

The CW Guide to Mobile Computing

Hardware

CONTINUED FROM PAGE 113

50% more battery life, they also e

with a 50% price premium.

Tied up at the dock If your users use a single m serve them in-office and on the road, consider decking stations. A docking station is an encasement the portable plugs into, providing additional expansion slots and a larger hard drive

An external monitor is usually placed on top of the docking station so that, in effect, the portable serves as the "brain" of the docking station. Toshiba America Information Systems, Inc.'s Deskstation and ports for an external monitor and An alternative is the smaller port replicator strip. Zenith Data Systems a AST Research, Inc., among others, offer these devices, which let you attach or de-tach a notebook from a desktop keyboard, monitor and printer in one step.

PCMCIA convenience
You've probably been hearing a lot about
that way-too-long acronym PCMCIA,
which stands for the Personal Computer Memory Card International Ass

specification. Once you get past all the

ers, the technology is quite us puts modem, fax, storage or local-area network connection capacitates on small PC card that slides into a thin slot on compliant notebooks. A 2- by 3-in. PC card can provide an RJ-45 plug to con-nect a notebook to a network.

There are three and soon to be four de signs of PC cards. All three types use the same female 68-pin edge connector but differ in thickness. Type I accommodates hin memory cards; larger Type II PC ards provide LAN connections or moems; and Type III cards can accommo-ate cards with moving parts, notably and disks of 100M bytes or greater.



Currently, you cannot add or remove PCMCIA cards without turning off your computer. But eventually, you will be able to do things such as use a modem card to download information from another computer, remove the modem card and insert a flash memory card to copy the data while your portable is still on.

Many low-end and high-end portable now include a PCMCIA slot

Insist on PCMCIA cards that comply with the PCMCIA 2.0 standard released with the PCACCA. Summars received hast September. It allows applications to run directly from the card, start more quickly and not require random-socces memory. The technology is still new; most vendors are reluctant to install the crucial PCMCIA socket services, which read cards, onto their systems. This fo s PC card makers to write sep

Of mice and modems
If your users run Windows, you'll need
to consider either a machine with a builtin pointing device or one of the many portable mice. Piacement differs from ven dor to vender. Compaq, for example, places its trackball sext to the screen. AST and Zenith Data have copied Ap-

pie's ambidextrous PowerBook des by putting a trackball front and center, below the space bar Others use the cursor arrows as mouse keys or provide a special mouse key that responds to fin-gertip pressure in all directions. IBM's TrackPoint II. a little red stick in

the middle of the keyboard, is also on the



Diagnosis: Acute Demanditis



Cure: SAPIENS

Addressing the demands of corporate managers, application users and everyone in between can be overwhelming. Unless you have SAPIENS**

SAPIENS' innovative rapid application development software builds sophisticated applications faster. And it slashes the time you spend updating those anolications.

SAPIENS also protects your mainframe investment with object-oriented technology that's databaseindependent and portable across MVS, VM and VSE environments. SAPIENS even offers a client/server solution that transforms your mainframe into a powerful enterprise server.

All of which means increased productivity for application developers. Satisfaction for end-users. A critical edge for corporate managers. And peace of mind for you.

Get the cure with SAPIENS products and services. In the US, and Canada, call today: 1 800 392-7028 (ask for 1003).

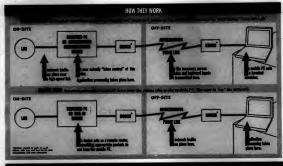




Two ways to make the LAN connection

REMOTE LINKS

A new technique turns mobile PCs into live nodes, not terminal emulators



HOW THEY DIFFER

Typically not as insurine, as users must constantly be aware that they are controlling a different PC than their own. This is particularly true for file transfer, where a separate file-transfer unity is used instead of the traditional COPY or XCOPY commands.

The user interface is exactly the same in a remote or local environment. The user has direct access to the local drives in the mobile PC and can use standard COPY or XCOPY commands to transfer files to and from a network file server.

Number of users supported

Because users work on fine with remote control and their sessions tend to be longer, fewer users per port can be supported (typically in the range of so to 20 users per port). REMOTE HODE

Because remote node connections are typically shorter (more of the user's work is performed off-line), remote nodes can support more users per port (typically 20 to 40 users per port).

by more expensive per port because there must be either a dedicated PC or an

No need for a dedicated PC board for each dial-in port. As a result, typically less expensive on a per-port basis.

Best applications

LIMOTE CORTRON.

LOS the server-based. Birds suited to DOS server/workstation applications or those organing significants ensewith Italific (as the actual network packets awarf transmitted with the approximations lime). Birds for on lime, interactive applications such as stated assets, order entity, implay, creates the must package, city.

Must reside on the mobile PC. Better suited to graphics and client/server applications as swell as those requiring mistively little network traffic. Also better for programs such as word processors and spreadsheets where the user can work off-line, using the network primarily for the transfer and instaled operations.

WHERE TO GET THE PRODUCTS

rum Com nunications, Inc.'s CentrumRemote San Jose, Calif. Cubix Corp.'s LCS/ACS

Carson City, Nev. Gateway Commu LAN Expander Irvine, Calif. ications, Inc.'s

egrated Workstations, Inc.'s Communique San lose, Calif.

J&L Information Systems, Inc.'s Chatter Chatsworth, Calif. Novell, Inc.'s Shared Access LAN Mode Provo, Utah

otics, Inc.'s Shared Access ications Server 386

Cayman Systems, Inc.'s GatorLink Cambridge, Mass. Digital Communicat Remote LAN Node ions Associates, Inc.'s Alpharetta, Ga.

steway Communications, Inc.'s LAN Expander Irvine, Calif. est, Inc.'s LANMod

Shiva Corp.'s NetModem/E, LanRo Cambridge, Mass. Telebit Corp.'s NetBlazer ST, NetB wale, Calif. UDS Motorola's LanFast Huntsville, Ala. U.S. Robotics' Shared Access LAM Modem, Shared Access Communication Server 386 Skokle, III.

Central Point Software, Inc.'s Commute Beaverton, Ore. crocom, Inc.'s Carbon Copy Norwood, Mass. Norton-Lambert Corp.'s Close-up Santa Barbara, Calif.

Ocean Isle Software's ReachOut Vero Beach, Fla. Symantec Corp.'s pcAnywhere Cupertino, Calif. iton Technologies, Inc.'s CO/Session

A third consideration: Remote-ready apps

node" comes another alternative for remote LAN access: remote-ready applica-

These programs were specifically designed for remote use with modeums over a phose line. Lotus' CCMail Remote is companion product to CCMail, for example, allows remote users to download their mail via modem and then work of line. then work off-line to reply to the messages and/or create new ones. On the next connection to the net work, these messages are uploaded and new ones

downloaded, etc. This type of off-line operation can make remote ready applications very appealing to the mobile pr

Because they run in the mobile PC, remote-ready applications act more like remote node than remot control. Many of them, however, require a dedicated PC on the LAN to act as a gateway for the remote users. And while they can be efficient and simple to

users. And wante usy can be entered and support of use, they often don't provide all of the functionality of their conventional counterparts.

In addition, since they're dedicated applications, they don't satisfy the need for a general remote LAN

access solution. On the other hand, if you need remote LAN access only for a specific application, such as E-mail, remote-ready applications can be a viable

These programs are few and far between, however, and you should investigate carefully to make sure the one you choose has all the features you need. In the future, remote operations will increasingly be huilt into conventioned applications.

Steve Magidson is an independent consultant special-izing in networking and portable connectivity. He can be reached on CompuServe at 72727,3266

Software distribution

TE CONTROL tion are simplified because the applicat Software undates and distri server rather than mobile PC-based.

RIMOTE MODE As applications are updated, they must be distributed to each mobile PC user. This can cause additional work for network administrators.

Popularity Deserve courses

Has about 60% market share, but ther's dropping. Still more popular when multiple ports need LIM access. Often used when individuals simply need to access their desixt PC from a remote portable, often without the need for LAM access.

Increased in popularity in the past year. Trends toward client/server and GUIs indicate it will become the predominant choice within the next one to two years.

Impact on management

twork management is contraited because the nodes are locally connected to the LAM 200K NO. While some solutions support tools such as SNMP, network manager difficult because the actual network nodes are remote from the LAN.

ecause most solutions use a separate utility for file transfer and this utility can be subled on a user-by-user basis, remote control can offer additional security by stricting which mobile users can transfer files to or from the file servers, irrespective

REMOTE HOSE

Users have the same access rights in a remote environment as in a local one, including the ability to copy potentially sensitive files to or from the network. This typically no convenient way to give a user different access rights in a remote to rement way to give a user different access rights in a remote vs.

Software licensing

Two issues: First, you need to acquire only one software ticense for each LAN need on the network, as this is where the applications are actually executed. The number of LAN nodes is typically much lower than the total number of remote users. Secontly, most remote control products charge a separate license lee for each remote uses although this fee is nominal.

Risorrs noted forcing existence on the mobile PC, there make be as many forcers as these are mobile PCs. Settooch enableges must be courted, forcering the position of the pos



LCD Status Bar: Delivers an instant read of the battery life remaining, power-saving mode, and a host of other key notebook settings.



Blazing 33MHz i486 SL: With built-in coprocessor support, delivers the ultimate in notebook processing power.

Some say the T4600 is Because in life, there



• 120/200/340MB HDD • 6.9 lbs.

NiMH battery
 T4600

 9.5" high-contrast, black and white LCD screen
 120/200MB HDD

6.4 lbs.
 NiCd battery
 ROTH MODELS.

 finel 4865L/33MHz, 3.3 volt processor with IK cache 4-MB RAM compatible to 20MB
 Type II (Form) and Type TV (16mm) PCMCIA slots
 BallPoint** mouse w*Chaick**Ort**
 Toshiha Max Time** Power Management system, and extensive 3.3v components provide industry leading battery life

Pre-installed software: DOS 6.0, Windows in Side Large 9.9" Color Active Marker TFLCO Screen. This exceptional technology delivers spectacular color for wivid graphics and duzzling protentations.

BallPoint* Mouse with QuickPort*: Attaches easily, without messy cords, for ergonomically ideal input perfect for Windows® annications.



Replace Your Desktop: Just snap your notebook into the Desk Station IV, and you're instantly connected to your printe; VGA monitor, mouse, and fullsize keyboard. Now you only need one computer-



better than life itself. is compromise.

Introducing the T4600 Series. Make no compromise.

Get the avesome power of a SaMHz i486 SL processor, and don't sacrifice battery life. Add a 9.5° color active matrix TFT-LCD screen, and access all 185,193 eye-popping VGA colors. Pack a massive 340MB hard drive and never have to leave a file at home.

340MB hard drive and never have to leave a file at home.

Get your hands on the BallPoint* mouse, snap it into its QuickPort*, and never waste a moment or a motion.

nuickPort[™], and never waste a moment or a motion. For a deal

Carry two slots for industry-standard PCMCIA cards — including one large enough for the new

generation of removable hard drives—and take the next big step in peripherals. Glance at the OttickRead LCD status icon bar

for an instant read of bettery life, power management, keyboard settings, and more.

This is no time for compromise. This is the time to get your hands on the T4600 Series.

For a dealer near you, call 1 (800) 457-7777.

In Touch with Tomorrow
TOSHIBA



Funny thing. Seems like every time we talk to a potential customer about our ONline intelligent switching hub, the competition immediately starts discounting the price of their units.

The reason is obvious: Since Chipcom has consistently led the way in hub technology right from the beginning. what choice do the others have?

First with Fault-Chipcom has built faulttolerance into all

its networking hubs since 1988. Today, our ONline System Concentrator provides the industry's most complete fault-tolerant solution for large facility-wide networks, with features like backup power supplies, and Controller Modules, redundant links, backup concentrator configurations, self-healing net-

work management and fault-tolerant transceivers. First with Multiple Networks. When we introduced the TriChannel backplane, our biggest challenge was getting people to understand that now one hub could do the work of three or more, supporting up to 3 Ethernet,

7 Token Ring and 4 FDDI networks with integrated bridging and routing. Or to under-

stand how much money it would save them on equipment purchase and oper-

ating costs. First with Port-Switching. Armed with Port-Switching, a network manager can do moves, adds and changes, and

can reassign any Ethernet port from one network to another with a couple of clicks of a mouse And only Ghipcom's ONdemand** Network Control System lets you design an intelligent network that can reconfigure itself on the fly,

do load-balancine on demand, and even Without the hoot itself. system and Port Switch-

ing, you get to make trios to the wiring closet to move cables. In fact, a lot of trips.

What does all this mean to you? It means that when you specify Chipcom, you're buying from a company that has always looked at networking differently. While the others were struggling with workeroup and departmental LANs. Chincom hubs were running the huge manufacturing and financial networks of some of the largest companies, banks

Under

tougher

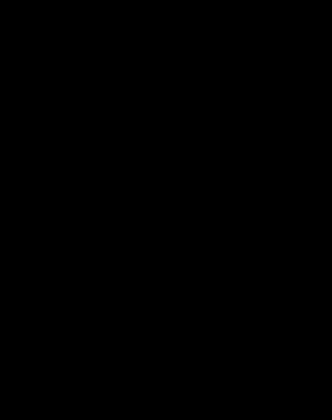
and universities in the world. conditions considerably than any you're likely to

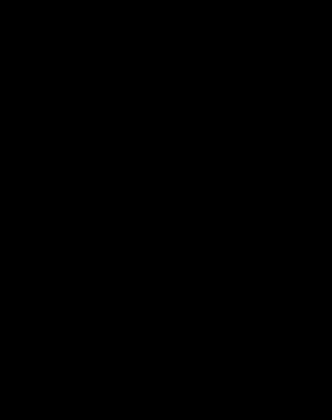
encounter Does this mean that Chipcom Ouite the contrary. costs more? network may actually À Chipcom cost less. And, over time, much less.

In fact, with the savings you can realize just from eliminat ing closet-level moves, adds and changes alone. You can recoup the entire installation costs of your network in less than three years. To learn more, call 1-800-228-9930 and ask for your free copy of "The Real Cost of Networking." And learn more about the real



CHIPCOM





White Paper



Redesigning the Enterprise

Buying an imaging and workflow solution shouldn't necessitate reengineering your budget. It's a pretty much agreed upon principle that the whole

purpose of business process reengineering is, ultimately, to save money and boost profits. So why is it that so many companies are considering

imaging and workflow solutions so costly to implement that any benefit is offset by the capital outlay and mair Cost Per Seat Companison

A bottomless bottom line. A lot of imaging vendors talk about how "easily" their systems fit in to your business process. They'll try to dazzle you with examples of the positive impact their system could have on productivity in your organization. Some will even offer complicated analyses which show just how much money your company could save - if only you

implemented one of their

However, what they don't like to talk about is how much money your company will have to spend to implement their system in the first place

The high price of productivity.

All these wonderful gains in productivity come at a pretty hefty price. Most imaging and workflow solutions have a bare bones price of \$1000 or more per user. And that's just for the basic software. What about the cost of hardware? Or developing and implementing an indexing system for your

documents? And how about developing the workflow application? A number of so called "solutions" won't even work with your current systems! All of this ultimately defeats the purpose you originally had in mind when you first considered an imaging and

workflow solution — saving money.

GY as a registered tradement of TechNNOMLOGY, Inc. All other product and

TechKNOWLOGY has an alternative. A full-featured imaging solution at a cost of as little as \$395 per user. And, that buys you a lor of power and performance. Like scan rates 50% faster than ViewStar, 87% faster than LaserData and more than twice as fast as FileNet. And you

get lightning fast automated document indexing, group III/IV fax compatibility, jukebox support, and built-in scalability.

A real team player. Unlike most of the solutions available, TechKNOWLOGY's imaging and workflow solution was designed and written to work at the deepest level of Novell Netware. Which means you get

significantly higher performance and speed for your applications. And there's never a compatibility issue. Which means you don't lose a penny on your investment in current technology. In fact, Novell liked our solution so much they now use it as their performance standard in evaluating imaging systems.

A simple matter of addition. Lower cost. Better performance. True compatibility. If

you're considering an imaging and workflow solution for your company, it all adds up to TechKNOWLOGY. If you'd like more information about the TechKNOWI OGY imaging and workflow solution, or a copy of the white paper "Selecting an Electronic Document Is

Solution," call us at (800) 264-0713 TechKNOWLOGY, Inc.

141 Fast 5600 South, Sinte 300 Salt Lake City, UT 84107



TechKNOWLO(The Imaging and Workflow Solution for Novell Networks

Introduction

Over the past several years, the computer market has been increasing its focus on the concept of business process automation. This is due in large measure to two factors. The first is a recognition among business and information systems (IS) executives that competitiveness in the '90s decriands automating the entire process of doing work, not just the individual diverse teaks.

The second factor is the emergence of a new universal desktop computing environment — one capable of truly integrating multiple windowed applications while networked to other equally powerful desktop systems throughout the enterprise.

Despite the huge investment in white collar work automation over the past 25 years, many studies have shown that office productivity has not substantially increased. This stands in stark contrast to factory automation, where investment in computing technology has dramatically increased the manufacturing output per works.

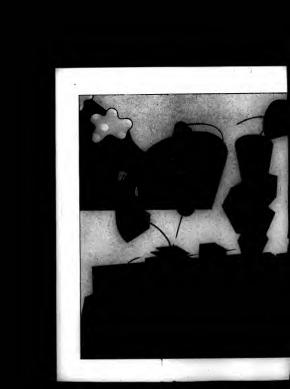
The rise of global competition for markets has now made productivity a basic survival issue for most companies, and in recent years there have been tremendous changes in the way companies are organized to perform office work. Those changes include decentralization, flatter management structures and more sophisticated information voxtems strategies.

Even a companies continue to invest in companting power, however, it has become clear that there is something in the nature of office work that resists improvement no matter how much power is brought to bear. This resistance can only be overcome with an ewit and/of software that deals directly with the inherent nature of the business process. Such software must integrate both information from multiple applications and the contributions of must pidelysials which the organization.

Driven by the combination of tremendous economic pressure and the recent transformations in office computing, this software — workflow software — has arrived.



This White Paper was written by
Bruce Silver of BIS Strategic Decisions, Inc.
For more information on the White Paper Program, please call 508-879-0700.





Like many high-tech buzzwords, "workflow" is frequently mentioned and widely misunderstood. Simply defined, it is the process by which individual tasks come together to complete a transaction - a clearly defined business process - within an enterprise.

Such transactions may occur repetitively in the normal course of business and follow a standard set of procedures processing an insurance claim is a good example. Or they may be purely ad hoc, occurring rarely and in everchanging forms. In either case, they involve the coordination of multiple applications or users. As a result. they need to be

tracked and automated.

WORKFLOW: Redesigning the Enterprise

Some transactions are not part of the regular business process, but recur from time to time and follow a more or less standard procedure. These may include a check clearance request, a travel authorization or the scheduling of iob candidate interviews.

A transaction or process may be relatively simple, consisting of only a few steps. Example: take a customer's call, find the requested information or activity

status and pass the requested information back to the customer. Or the transaction can be extremely complex, spanning many different departments, requiring the involvement of a dozen or more individuals, and consisting of hundreds of discrete tasks. Workflow automation in the broadest sense includes both of these situations.

Production vs.

While establishing the broad to business need for workflow software and services is easy, defining the market for them is more complex. The market is formative, and most users are still trying to understand analysic concepts and the relative value.

ues of specific functions.

There is a variety of workflow software products currently available. Some automate a line-of-business process while others manage a

intended to be used by clerical workers, while others are designed for professional, "knowledge" workers.

Savvy would be users have to understand their own needs before buying workflow software. They nould ask themselves if their work is driven by documents or folders, or if it is better viewed as a set of tasks and decision options that may or may not include attached docu-

ments

Perhaps the best way to differentiate workflow software products is by breaking them into two cate-

gories: production workflow and ad x. hoc workflow. Production workflow software automates repetitive mission-critical processes such as insurance claims, loan origination, accounts payable

processes such as insurance claims, loan origination, accounts payable or sales order entry. Most often, these processes are clerical, document-driven and tightly integrated with line-of-business computer applications. They may, however, rep-

resent a routine office activity such as a travel authorization or an expense report. In a production workflow environment the process obeys sets of codified rules and policies that are consistently applied to every

work item.

Ad hoc workflow, on the other
of hand, automates unique or occasionally used processes. These
processes may be mission-critical to
the core business but are more often
associated with routine office procedures, such as correspondence management, interview scheduling or
They are typically used by knowle edge workers, but are not usually
document-driven or tightly inte-

grated with line-of-business application software. With ad boc workflow software, the process required for a given work item is not predefined, but more a matter of individual judgment and decision. Where production workflow software seeks control. and transaction efficiency by inte-

ment and decision. Where production workflow software seeks controll and transaction efficiency by integrating information, ad hoc workflow software is more concerned with coordinating and integrating human activity.

The majority of the workflow

The majority of the workflow software business today is concentrated on the production side. And most of that has been associated with document imaging technology. The software has largely been provided by the document image management vendors. The use of imaging technology with workflow software is not acquirement—the need for workflow automation goes far beyond the imaging market

far beyond the imaging market but it is a common occurrence. In the mid-80s, FileNet Corporation was the first to perceive that the essential problem document imaging solved for businesses ovierrum with paper was not so much storage and retrieval as much as it was moving and coordinating paper-based information throughout a department or enterprise. In a word, work-



So, you SAY you don't have a problem with workflow?

Although companies have invested billions of dollars in technology, the hourly output of the

average worker has increased by only 1% per year, over the last two decades. What went wrong? It's largely a matter of different technologies moving in different

directions, at different times. So people spend more time thrashing

work done. Fortunately, there's a way to get everyone working in sync: InConcert Workflow Manage ment Software,

than they do getting

from XSoft. InConcert goes beyond the typical idea of "software," because it's tailored specifically to your business. And by synchronizing the flow of information to the right

people at the right time, it will

fundamentally improve the way you do business InConcert makes life easier for system administrators and

users because it's fully open. It's easily integrated with your existing hardware and software and compatible with any database you choose. But more importantly, InConcert is extraordinarily easy to use. Users carl complete even the most complex tasks through a simple graphical interface. So they actually enjoy using it.

Curious? We'll send you a free white paper, "Getting the Job Done: A Guide to Workflow Management." Just call 1-800-626-6775, ext.146.



flow. FileNet put workflow automation tools at the heart of its document imaging software. The compamy defined the core set of services. development tools and administrative functions that

with workflow software is also high.

virtually all docu-

The buyer's

motivation for purchasing ad hoc workflow software comes from a sense that routine office work needs new

tools for coordinating and tracking activities that involve multiple users.

junction with imaging, can command prices of \$2,000 per user or higher and still generate a bigh return on investment. Where production workflow software usually can be justified by reducing the cost of a particular busi-

ness process, ad hoc workflow ment imaging vendors offer in some software is geared to a less specific form today. need. The buyer's motivation for The association purchasing ad hoc workflow softof imaging with ware comes from a sense that rouworkflow is a nattine office work needs new tools for

ural one because coordinating and tracking activities the businesses with that involve multiple users Despite the proliferation of Ethe biggest transaction processing mail for point-to-point messaging, and specific personal productivity costs are typically ones with high-voltools like project management or ume, paper-driven calendar software, these products by themselves do not track and coordioperations involving complex inter-

nate processes involving moltiple actions between steps or multiple users. multiple users. Be-Unlike the situation with production workflow software, the need for cause paper-processing costs are high, the value of ad hoc workflow software is quite broadly based, touching essentially roving transaction efficiency all office workers. This need will

The demand for ad hoc workflo software is a logical by-product of the tremendous growth in PC networking and E-mail, the most significant computing phenomena of the '90s. Withoot workflow software, users today are connected over the network but unable to fully coordinate their work. Workgroup productivity suffers accordingly. Workflow software aims to rectify

Unfortunately, in the case of routine office work, the cost of not having workflow software is difficult to calculate. Cost-justifying ad boo workflow software is hard because the cost of the process it improves is unknown. How much is it worth? If it is viewed as an extension of E-mail or a network operating system, does that mean it is worth only a fraction of those packages? In this environ ment of uncertainty, workflow software's value is being determined by the norms applied to mass market PC applications. Consequently, the ad hoc workflow software market, in contrast to the production workflow market, is more likely to be driven

by the mass market players. **Workflow Software Market Segmentation**

Although production and ad hoc workflow are the two most notable workflow software elements, there are others. They include "document-centered" versus "user-centered" tasks, In a document-centered task, the required processing is determined by a work package, often a document or folder. Usercentered tasks are more general and are performed by multiple users in a coordinated fashion.

Document-Centered Production Workflow

Of document-centered versus user-centered applications, the document-centered production segment - as shown in the opper left quadrant of the preceding "Work-

continue to expand, as will the For this reason production workflow software, particularly in connumber of ad hoc users. CURRENT STATUS OF WORKFLOW SOFTWARE IN SURVEYED COMPANIES



WORKFLOW IN ACTION: **Aetna Health Plans**

Aemo Health Plans (AHP) processes approximately by. If a folder mistakenty contains two claims in one, 80 million health insurance claims per year in 34

claims offices nationwide. Its use of workflow software in conjunction with document image management is an outstanding example of a document-centered production approach. AHP's implementation is based on software from ViewStar, a leading vendor of production workflow software packaged as part of a.

document management system Processing health claims is one of the most paperintensive of all transactions, and one that typically involves the movement of documents among many individuals in an office. Customer service representatives, who answer questions for policyholders, require con-stant access to new and historical documents. Claims representatives must know that claims have been received, their current location, and their processing status from the minute they arrive in the mail room.

Before the implementation of workflow software at AHP, this information was unavailable until the claim processing was complete, up to nine days after the claim was received.

AHP's workflow starts in the mail room where the

incaming claims are barcaded and scanned. The warkflow software outomatically imports barcaded information into the ViewStor database, logging the claim, assembling all the attached documents into a folder and generating a unique ID number before for-warding the information to an indexer.

The indexer retrieves work from a queue and enters claim data from the scanned images. After index-

ing, each folder is forwarded to a workflow server, which makes complex processing decisions based on instructions programmed in ViewStar's fourth-generation language script.

Software on the warkflow server then does the fol-L-wing: rms that each falder represents only one fami-

the workflow server will automatically split it

 checks the claim data against main-frame-based eligibility files, routing the folder to an exception queue for resec if necessary, or to a fax queue if the claim must be forwarded to another Aetna office.

· adds additional data to the folder from the cyholder file. This data may include group number, patient name, and codes to assist in claim pro-cessing or automatic generation of form letters.

· searches the system for other folders relating to the same family, merging them for processing.

• identifies "special handling" claims — for example, those with high dollar amounts — and routes

them to priority queues for fast review.

• distributes validated claims to the appropriate work queue for adjudication and payment. Claims

processors drawing work from these queues are pre-ented with a customized Windows screen including a 3270 host window, an image window and a data form. They can key information into the host application from the images, place folders on hold pend nal documentation, or attach annotations and end the folder to a supervisor or analyst for furth

Within nine months of initial implementation, AHP was enjoying a 25% reduction in claims processing time, a 15% reduction in the processing of invalid or duplicate claims, and a tremendous overall improvement in customer service. Based on 80 million clais per year, these benefits add up to millions of dalls in savings. In addition, customer service represen tives now can access submitted claims within 24 hours of their arrival, instead of waiting nine days. Fi-nally, AHP is able to increase market share based on

its ability to process more claims.

flow Software Market Segments" chart - is more mature. This segmeat is dominated by the image management vendors. Within it, the work process is document-driven, mostly by paper. Because of the high cost of processing transactions based on manual paper routing, the combination of workflow software very expensive. and imaging technology provides a particularly high return on investment within this segment.

In fact, the benefits of workflow automation often represent the key to payback on the overall documen

More than simply providing vork routing, workflow software in this segment is increasingly concerned with automating complex processes involving multiple disparate computer applications. In fact, integrating information from imaging investment, which is still

multiple sources is a workflow software feature that production workflow software vendors typically stress even more than automatic Production user-to-user rout-

workflow software

This integration allows work to be usually involves the routed to shared automatic exchange of data between processing aueues. multiple applica-

tions simultaneously running in windows on a single user's desktop. A typical example includes a terminal emulation program running a mainframe application, a LAN-based document management system and a desktop

word processing program. Because the work is part of a production process, multiple users are often performing similar tasks. Production workflow software allows

work to be routed to shared processing queues, from which it is dynamically distributed to the next available user in assembly-line fashion. Saying that the work process is "document-driven" means that the

particular set of tasks that is executed fits a standard pattern associated with a particular document type or set of documents, Examples include an application for credit, an invoice, or an insurance claim. Today, these transaction source documents are

often paper, but they will increasingly be electronically generated. Standardization and proliferation of Electronic Data Interchange (EDI) will force production workflow software products to embrace

these new types of documents. This will also be the case with the growth of a host of new technologies connecting mobile sales, service and professional workers with central-

ized administrative processing centers. These technologies include pen computing, wireless networks and digital signature authorization via E-mail. The nature of the document may change but the process remains one of transaction automation.

Group-Centered Ad Hoc Workflow

The bottom right quadrant of

Segments* chart represents a contrasting vision of workflow automation. Group-centered ad hoc workflow starts because a work process requires the coordination and the tracking of tasks performed by multiple individuals. Workflow consists of work routed from individual to individual, "Work", is a request to the user to perform some task or make a decision, e.g., "approve or reject this proposal."

the "Workflow Software Market

WORKFLOW IN ACTION:

Consolidated Edison

Document-driven production workflow does not re- limited in their ability to respond promptly to cusquire imaging, olthough the imaging vendors today have the most mature tools to handle high volume transactions. In this example, an imaging workflow vendor, Sigma Imagms, has used workflow software with ASCII text files, not images, to solve a or customer service headache for Consolidated Edison, New York City's electric

Con Edison of New York has 20 sites and 1,000 service representatives in its customer service or zation. Each day meter readings are taken by field support staff throughout the New York metropolitan orea. The readings are transferred to the central rame, which identifies inconsistencies and generates account investigation listings (AILs) for problem resolution. Approximately one million AILs are gener-

ated each year also each year.

Prior to the implementation of workflow software,
Alls were printed, manually sorted and delivered to
customer service reps for follow-up. This process in-cluded thousands of pages per day. The reps were tomer inquiries because supporting documents were not at hand. As a result, much time and ergy was required to retrieve filed (and sisfiled) documents.

Using Sigma Imaging's OmniDesk soft-ware, Can Edison is able to load mainfrome All date directly into OmniDesk forms. This data is outomatically indexed and queued for workflow processing and distribution mer service representatives.

Workflow routes are constructed to meet a wid variety of local needs, and can involve hundreds of uting rules. Because of the graphic nature of Omni-Desk workflow tools, these routes can be defined by non-technical customer service managers; they do not quire o programmer. Customer service reps now trieve the AlLs from their workflow inbox, and by cessing multiple windows on the workstation, car view the data, compare it with a mainframe-based account history, and resolve the problem. Can Edson onficipates it will save almost \$2 million annually with this system.

ODESTA'S OPEN ODMS" FOR WORKFLOW, IMAGE AND DOCUMENT MANAGEMENT.

The following true stories are about companies that have experienced a breakthrough in the quality of their business processes. They tell how information anarchy and organizational sludge were finally overcome. They demonstrate how new tools like version control, routing, status tracking, and cross platform development can quicken the pulse rate of a business - processes that took days or hours are now accomplished in minutes. They show how the mishmash of priorities, information, software and hardware scattered from desktop to mainframe was replaced by a single integrating system - Open ODMS.

- To a leading pharmaceutical company in New Jersey, the solution was a research and development system developed with Odesta's Open ODMS. A process that used to require three different expensive, slow, and hard-to-use systems now runs on an industry standard SOL database in a client-server environment. What used to take between two hours and four days now takes between two minutes and ten minutes. Now research scientists and other knowledge workers use Macintosh and Windows PCs to search whole fields of research data and documents by keyword and with a third-party content-based retrieval product integrated into the system. The system provides version control and a common interface for word processor files. It even supports remote researchers from other locations in the U.S. and Europe over a T1 link. Together, we got the system up and running in 92 days.
- To a leading energy company in Alaska, the solution was an engineering document management system developed and repair documents such as pipeline schematics or scanned valve specifications, it had been necessary to search through sides full of drawings and stacks of printouts for hours, sometimes days. Now this critical information is available in minutes to any user with a Macintosh or Windows PC. Where version numbers and change orders were usually ambiguous or nonexistent, all documents are now automatically version controlled, annotated, and managed with RS-6000s, SQL databases, and optical servers from above the Arctic Circle in Prudhoe Bay to Anchorage. The system was up and running in 90 days.
- To a leading acrospace company in Seattle, the solution was a cost document integration system developed with Odesta's Open ODMS. Nev to the success of proposals for major contracts, the cost document must incorporate text, graphics, images, and tabular reports from many sources. What had been done manually and used to take one month now takes two days. Now, when cost information is entered into Macintosh and Windows PCs, an automatic transfer of data from the IBM mainframe to the VAX server takes place. The cost document integrates word processing, spreadsheet, and scanned image files from the desktop. The whole cost document (\$0-30,000 pages) is then automatically built with Microsoft Word on a Macintosh and printed. The system was up and running in 87 days.
- To a leading airplane maintenance operation in San Francisco, the solution was a technical data routing system developed with Odesta's Open ODMS. The old paper routing with Odesta's Open ODMS. To work with critical maintenance process that took 60 days and was of inconsistent quality now takes three days and is quality assured. Now as airworthiness directives from the FM and service bulletins arranniness directives from the revision service benefits from manufacturiers are received, they are automatically routed to the appropriate engineer. The system provides on-line query capabilities as well as an audit trail for each document. An in-house e-mail system is used for notification. Management can get a report on all the unresolved technical maintenance issues in between one and five minutes. When it is fully rolled out, this client server system will support 900 engineers. The system was up and running in 73 days.



PREFERRED WORKFLOW SOFTWARE PLATFORM

This automatically forwards the

fined in the workflow, possibly de-

pendent on the specific action or de-

er form created by the acc

The image installed base of PC/LAN users is fortile ground for workflow software implementations.

In its simplest form, this type of workflow software exerts no control electronic form. at all over external computer applications. It just routes messages emwork package to the next user de-

bodying these requests for action or decisions, typically as part of an electronic form. Each user perform-ing work indicates completion of

the work package in succe see a different version of the form, reflecting the particular work re-quest and decision options defined by the workflow originator.

Such a baseline capability --- de-livering messages to users on a network - is already available to most networked computer users today in the form of E-mail. Adding workflow to this sequential forms routing process represents a major enhance ment and will be provided within a year by most E-mail vendors, including Microsoft and Lotus.

Thus this form of workflow soft ware will become nearly universal within two or three years as a basic E-mail function at little or no cost. As such, it will bring workflow capa bilities to the mass market. And this F-mail-enabled workflow software will not be underpowered compared with standalone packages.

While the work may not general ly be document-driven, documents, including images and annotations, can easily be included as E-mail attachments. In addition, software "agents," or background programs monitoring a user's mailbox for incoming messages, will be able to de-

the requested task or decision via a check box or action button on the

WORKFLOW IN ACTION:

Young and Rubicam

Although group-centered pro-ction workflow software is still in n workflow software is still in ancy, there are a few intrepid users. A pioneering example can be found in the project traffic control system at Young & Rubicam, one of the nation's largest advertising agencies. The traffic control system is embodied in the internal client project management process, which involves a mass of paper forms and the need to coordinate

Finally, supplier purchase ord must be created. In the traditio the activities of many groups.

The process starts with a work offic process, all this work adds

p to a paper nightmare. Y&R's workflow application uses Action Technologies Inc.'s work executive. The work order is then copied and distributed to creative services, which prepares concepts and layouts. Layouts must be ap-proved, distributed and filed. Cost estimates must be prepared by the art director, production manager and media planner. Client signoff is required. Final art must be pre-pared and approved by the client.

cision indicated. Each user receiving tect and filter arriving workflow

flow companion product to Lotus Notes. Notes constitutes the docu-ment database environment for Action's unique workflow methodolo gy. Action views every major activity within a workflow sequence as consisting of four steps; a re quest, an agreement, work comple-tion and acknowledgement of satis-faction. The firm's methodology consists of analyzing workflows packages. They can then initiate cer-tain desktop functions automatically. Deadlines for each work step can even be assigned, and alarm messages sent automatically if the work

Such function provides significant task coordination with very lit-tle change to standard mail systems. By itself, however, it offers little in the way of control over the work process. It cannot answer basic questions like. "Where is the work now?." 'What has been done to it?" and

"What are the actions remaining?" These kinds of questions require a central information repository or database that is updated by all the individual workflow processing events. Such a function is beyond standard E-mail capabilities. Nonetheless, a workflow tracking database will be a key component of specialized workflow software engines that allow the group-centered work model to deal with critical business problems.

Group-Centered Production Workflow

The need to organize and track complex processes performed by workgroups leads to a grander viCURRENT WORKFLOW SOFTWARE STATUS Source: 825 Strangic Decisions

production workflow quadrant, in ed to obey a stable, but sometimes

sion of workflow, one in which co-ordinating human activities is as im-flow Software Market Segments" portant as integrating computer ap-plications. The group-centered Here the processes are coordinat-

and breaking them down into graphic "loops," each of which embodies this fourstep cycle. Y&R's workflow appli-cation differs from those at Aetna and Con Edison in that it does not require integration of computer pro-grams so much as the coordination of human work. Even so, assistance by Action's consultants was necessory to analyze and map the workflow. This analysis forced Y&R to

identified battlenecks and gray areas in the current process. As an extra benefit the process also made Y&R cli

aware of their responsibilities. While many users and man-ogers were skeptical at first, the ini-tial pilot, involving a single advertis-ing client, has proven to be a great success. No formal cost paybook data is available, but a very revealing survey of users before and after apply a logical structure over a sometimes chaotic process. It also they believe they are working much

For exo are a brief dropped from 71% to zero. Those saying it takes too long to file and sort documents fell from 50% to zero. Frequent dup of effort fell from 42% to zer ed on time with no rush re om 32% to 52%, Jobs cor on budget rose from 73% to 87%. Y&R expects to rall out the Notes/Action workflow to other clients in the near future.

fuzzy, set of rules and procedures. This is clearly not an ad hoc environment. Examples of group-centered production workflow applications include processing purchase requisitions, resolving field service problems and even new product development. The goal in each case is a faster and smoother for process achieved by co-

The ability to process achieved by coordinating the activities of multiple individuals or groups. In contrast to those

than named users in the document-centered production segment, these processes are often measured in the document-centered production segment, these processes are often measured in the document-centered productions are of the measured in the document-centered productions are of the document-centered productions.

onds or hours. They
goes beyond also do not require dystandard E-mail
capabilities. equivalent human
processors. Consequently the group-centered produc-

tion segment tends to rely on E-mail rather than a shared database connection as the basic link between workflow participants. It does, however, require more than hasic E-mail capabilities.

For example, intelligent rulesbased routing is required, as well as interfaces to exchange information with external applications on both the LAN and glass house hosts. The shility to forward work to "roles" rather than named users is another production-level feature that goes beyond standard E-mail capabilities. Administrative utilities that map users to a set of roles, or override the workflow route and move work from one queue to another, are also typical in this type of workflow software. But the most important differentiator is work tracking and reporting.

Document-Centered Ad Hoc Workflow

Finally, the fourth quadrant in the "Workflow Software Market

Segments" chart, document-centred able workflow, comprises an unusual combination. As in the group-centered ad hox segment, the work flows: represent occasional processes, but processes revolving around the handling of external documents, either electronically generated or in the form of scanned mages. Easier self-centred or in the form of scanned mages and noting documents for comment or approval. Products in this category provide

tools that allow any user to initiate an ad hoc workflow closely integrated with a document management system. Such an arrangement, while less flexible in some ways, is useful if the workflow involves the sharing of significant document volumes, particularly images or other large object tones.

significant document volumes, particularly images or other large object types.

The link to a document management system allows documents to be moved "by reference," i.e., without

moving the physical file over the network.

At some point in the future, facilities for indexing and high-volume storage of large objects will be commonly found in network operating

monly found in network operating systems. A current example is Novell's image Services for NetWare. When all network operating systems are thus endowed, E-mail vendors will be able to provide much of the function required for this segment.

Workflow Software and Reengineering

of workflow software with "the business process," the implementation of workflow software often occurs in conjunction with a broader reenging intering initiative. Business process greengineering involves analyzing the word organizations do their work now, and how, with the right technology, they can be made more efficient of the process of the proce

nology, they can be made more ethcient.

While business process reengiin neering is a great help in maximiz-

to wedware, it is not required, and sometimes and twen recommended by the control of the control

What Users Want: Products Even though the workflow man

ket is in its early stages of development, some user demands are already clear. For instance, most users are looking for workflow products

that:

Allow them to get started quickly.

If developing a workflow application
requires months of study and maes are program development as part of
a monolithic reengineering for
to users will not commit. Experience
has shown that an incremental gegas application and embracing a gradually increasing number of users
to require the program of the program
ere reengineered process functions, has
a greater shance of success.

Allow then to modify and evolvthe worlflow themselves. Users know intuitively that the right worlflow design will require their own experience, plus a certain amount of trial and error. They do not want worldflow modification requests to add to the Es application baddop, Quick we spouse is mandatory. For this reason, graphic tools that allow non-programmers to modify, maintains and even develop worlding applications. Handling a fixed sequential process.

Handling a fixed sequential process is easy; the payback from workflow comes from handling the exception cases. The old maxim that 80% of the time or cost is spent on 20% of the work applies here. That 20%

WORKFLOW IN ACTION: **British Petroleum Exploration**

British Petroleum Exploration in Alasko has respond-ed to regulatory and business requirements with Open ODMS, a workflow and document management system from Odesta Systems Corp. BP needed to manage its 200,000 engineering drawings in support of the company's North Slope activities. The combination of document management

and workflow software was required to ochieve an "evergreen" state of information currency, improve business performance and address regulatory requirements.

In Alaska, BP operates its production facilities well above the Arctic Circle, 800 miles north of its offices in Anchorage. A distributed, client-server approach was required to support the mission-critical engineer ing needs across such distances. Up to 200 staff members in both Anchorage and in the remote field facilities can now search, retrieve and view drawings and other documents from a Macintash for review, analysis, change monogement and audit purposes.

Mark-up and edit tools allow the technicians, open ators and engineering staff at all sites to com-ment on field conditions or suggest modifications graphically. The information can now be shared electronically across multiple en-gineering projects and geographically dis-

persed sites.
Workflow software is used in revising the original drawings, as well as for work package routing for the review, preparation and ap-proval of drawing changes. While the primary process of revision control has already been streamlined, incremental process reengineering apportuni-ties are surfacing as familiarization with the technolo-

Benefits from the Open ODMS solution are exp ed to approach \$2.5 million annually. And this figure is expected to increase significantly as the further potential of the technology for risk management and enterprise-wide workflow and document management is realized.

represents the cases that require special handling. Workflow software products that allow complex branching based on identifying exception cases are already the norm, at least in the production workflow segments. What is new is that a user processing work in the middle of a workflow route can perform two tasks: note an exception condition totally unanticipated by the workflow application developer, and add some processing steps on the spot. The use of object-oriented technology in workflow software is a key part of this development.

What Users Want: Services Beyond workflow automation products, users are also looking for professional services to help them analyze their existing processes and reengineer them. Here, too, they are looking for basic essentials such as: Proven experience. Many comput-

their service businesses as hardware margios shrink, but oot all have the process redesign or analysis experi ence to back it up. Users want to see evidence of past success, preferably in a similar industry or application. Reduced investment risk. Users are willing to spend money on workflow analysis and design services when these products reduce, rather than increase, the risk of a bad techinology investment, Gode are the

days when users readily accepted a \$200,000 design study for a \$350,000 investment. If there is risk, users want the service provider to share it, and perhaps provide incremental services to go along with a gradual workflow implementa

Use of a standard methodology. Process redesign and application development services that make use of a standard methodology give the workflow software vendor strong credibility with users. It usually means better trained consultants er vendors are rapidly expanding

who can draw oo experience gained through the repetitive use of a stan-dard methodology. Users want a methodology that employs a software tool to model the workflow, simulate how it would work, identify the bottlenecks it is likely to encounter and generate the actual workflow softwa

Involvement in the reengineering rocess. Many users have a justifiable fear of being shut out of a process reengineering effort led by an outside vendor or even internal IS staff. The users have to live with the end result so they want to be part of the process. The most successful implementations of workflow analysis and development projects heavily in-volve users, IS and the vendor or

Workflow Market Profile

vendors

BIS Strategic Decisions, in co nction with Computerworld, rently conducted a survey of 600 Imaging

Come and discover bow Document Imaging can benefit your organization at Europe's largest Document Imaging conference and exhibition.

The Exhibition

Imagine finding all the world's major Document Imaging products and services agether in one location, staffed by the most knowledgeable representatives. Over 125 companies from around the world will be displaying the very intest in One 12 5 companies from around the world will be displaying the very latest in imaging workshops; privat across some from 10,000 square motions of either language your life flow state of the art displaying featuring a broad range of integring products and services, including deferenced imaging, more programs and physical products and services, including deferenced imaging, and in the contraction of the companies and physical Whether you are new to insight, or highly experienced, IMC Document Imaging '53 will be the best opportunity flow pos to see it all.

The Conference This year's conference will be a three-day, three track program, featuring nearly 60 speakers. It will be the most comprehensive conference ever offered in Europe. In just three days you'll get the answers to the most important issues faced by those involved in managing information today. All from acknowledged leaders in the

FRIE

- Simultaneous translations will be offered in Dutch, French, German and English Yes! Mease pre-register me for the IMC Exhibition a 500 BEF value

 By per-registering you will be entitled to amend the exhibition on any day or days that
 you choose. Simply pick up your hadge at the Brunels Exhibition Centre, Heisel
- Also, I am interested in the IMC conference. Please send me more information regarding subjects, speakers, costs, etc.
- I would like more information about how my company could become an exhibitor. Please send me an exhibitor information ldt. Einst name: _____ Title: ___ Fort Code: _____ Town ___ Country:

Please mail or fax to:

Preser man or tack.

IMC, European Headquarters

Bargemeester Biospelskaan 29, 1181 NB Amsteheen, The Netherlands
Tel. 31 20 641 58 94
Fax. 31 20 643 99 56



U.S. uses to determine the current profile of the workflow software market and to project future trends. It has reposted to the trends to the respondents represent purchase ing decision-makens spread across a wide spectrum of industries and company sizer. Two-thirds of the respondents come from 18, the rest come from a line of business. According to the respondents come from 18, the rest come from a line of business. According to the rest of the

another 2.6% say they have selected a product, but have not yet installed flow opportune if the New Post of 19% of them have installed or selected a workflow product, compared with only 12% of the 15 respondents.

In addition, 48% of all respon-flow offware the New Post of 19% of 1

In addition, 48% of all respondents are investigating the need for workflow. Only 37% are not considering the adoption of workflow automation at this time, because IS appears more inclined to reject the technology.

The following vertical industry groups are particularly bullish ownrkflow. financial services, transportation, communications, utilities and insurance. On the other hand, wholesale/retail, government, education and professional services armore conservative in their workflow

adoption plans. Overall, respondents rate today's need for workflow software in seneral office processes equal to the need for workflow systems in lineof-business applications. Today's workflow market, however, is predominantly concerned with production applications in line-ofbusiness processing. Counting only those respondents with workflow applications installed, workflow automation of line-of-business applications is more important than workflow automation for office applications.

In particular, respondents interested in document imaging rate the importance of workflow technology for line-of-business applications higher than they do for office or ad boc processes. Line-of-business workflow processing is also ratedhigher by those favoring the following large system workflow platforms: mainframes, minicomputers and Unit client-grayers.

LOB Importance

Line-or-business worknow appurcations are viewed as significantly more important than office workflow opportunities in certain vertical industries, as well. These include banking and finance, insurance, transportation, communications and utilities. By way of contrast, wholesale/retail, deducation and government users consider office work-

flow software to be more important.

Line-of-business processing covers a mix of production and ad boc functions, but tends to be more production-oriented. For instance, workflow procedures for line-of-

business applications are viewed by most survey respondents as structured and relatively static. This view is especially strong among imaging users, a fact that reinforces the perceived strong connection between document imaging and "paper mill" industries with production work-

flow software.

The need for workflow software in line-of-business applications is higher within the largest companies with over \$100 million in revenues than it is in smaller orles with under \$100 million in revenues to the other band, office automation workflow software is rated equally important by respondents in all company sizes except for those with under \$1 millions.

lioi in annual revenues.
Surprisingly, over the next three years, respondents foreue a stronger rise in the importance of line-of-business workflow than they do for office workflow. This is surprising because the technology for production workflow automation software

COMPARING THE WORKFLOW SOFTWARE NEISS OF GENERAL OWNER INFO GENERAL OW

Witten counting only those respondents with workflow software installed, workflow autocration of inte-of-business applications is viewed as significantly more important the office seed in the contract of th



sty percent of all European survey respondents have installed or selected a workflow lack.

in line-of-business applications is more mature and better established than is ad hoc office workflow soft-

ware technology.

Of course, the proof is in the actual adoption plans. The adoption
rate as measured by respondent
plans for an initial pilot within one
year favors in me-of-business work.

Software by a two-to-one margin
(45% to 23%). Within three years,
however, the adoption of officebased workflow automation will
occur in nearly as many companies
si line-of-business-based workflow

about one year behind that of lineof-business applications.

Based on survey results, users are
more optimistic than Its about initial
adoption plans for both types of
workflow software applications during the next 12 months. However,
looking out two years or more, both
wers and IS predict the same rate of
initial workflow adoption. As might
be expected, large companies are
be expected, large companies are

planning much more aggressive im-

tion rate of workflow technology for

office automation appears to be

plementation schedules for workflow systems than are smaller ones. Who are the likely users of work-

Who are the likely users of workflow technology? Overall, retpondents view the importance of workflow software for clerical workers,
slightly higher than they do for professional workers or management.
Within there years, however, they
say the importance of workflow systems will increase to all three
groups, but still more so for clerical

Survey respondents clearly pick PC LAN client-server as the current by preferred workflow platform. And that preference will only strengthen. Overall, 59% pick PC LAN as their current workflow platform, compared with 44% for the desktop, 24% for minicomputer, 18% for Unix client-server and 17% for

The survey clearly shows that I users view workflow software application development as a responsibility of customer organizations, in not vendors. Overall, 64% of respondents look to their IS organizations as a primary source of workflow applications while 24% view

line-of-business end users as primiry workflow developers. System integrators are next (20%), with workflow software vendors (14%) and independent software vendors (12%) trailing. Respondents also indicate a

strong preference for the incremental rengineering approach, asked to rate four approaches to rengineering on a five-point scale, responents clearly favor a combination of gradual reengineering after implementing an initial workflow software application. The second preference is for a complete reengineering before initial implementation.

Workflow Software: Business Tool for the '90s

The worklow software were exponent or exponent or exponent or the worklow in the exponent of product and service of ferings in all segments of the market. Even products that bridge the production-ad hoc divide are emerging, as established workflow software vendors seek to broaden their markets. Interest among users is high, but they are asking for robust tools they can use themselves.

is high, but they are asking for robust tools they can use themselves.

Major PC, software vendors are just now getting into the arena, and this will greatly advance the education of the mass market, creating additions of the arena and this will consider the additional and additional distribution of the additional and additional production and additional and additional and additional and additional and additional production and additional additional and additional and additional additional additional and additional additional additional and additional additional additional additional and additional additiona

One thing is certain, however:
The economic pressures to increase
the productivity of office work, in
combination with the nearly universal networking of powerful multiwindowing desktop computers,
makes the future growth of workflow automation software a sure

ing. 🗷

Now that you've read about workflow, what about

like workstations, applications, 2/ locations, platforms, databases and a feisty board

Salusiana Regin With Recognition

Plexus* FloWare** software is one reason why Fortune 500 companies bring their workflow problems to ecognition. It can be integrated into platforms, workstations, databases and applications. Which means no other workflow system can impact y battern line more tavorably. More pr

multiple solutions begin with Recogni

POR RESILES TO YOUR WORKERLOW PROBLEMS, CALL

Now what? You need a partner. One who

knows work management. Thinks office productivity. - Does office software. And is driven like

yourself. A partner like Wang. We know business process management, imaging, document management, and workflow. We created the best imaging software products you can buy. Totally

open. Using the most advanced technology-and for far less

than you think. Our OPEN/image products are built with the best from the best: UNIX. Windows, NerWare, From IBM, HP. Microsoft, and Novell.

O.K., so you've got what it takes. Wang gives you the power to image-enable any environment; to connect imaging to

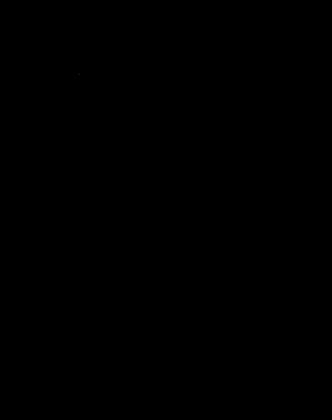
your applications. That's why we have more imaging solutions installed than anybody. Wang has always

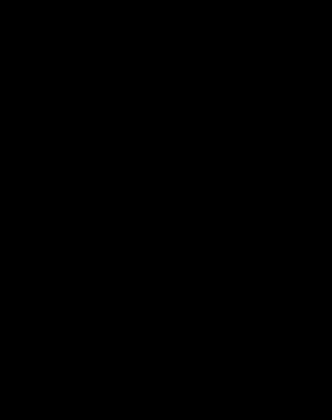
> been-and still isthe leader in developing imaging solutions on multiple platforms. Does that make our customers happy? Just read the latest Computerworld Buyers' Scorecard on imaging. There are good reasons why we're #1. (If you don't have a copy.

we'll send you one.) So if you're ready to change the way you do business, talk to somebody who knows a lot about change, Call Wang.

> 1-800-229-2973. You have what it takes. And so do we.

OFFICE PRODUCTIVITY SOFTWARE







BM's Think Pad tops user ratings in competitive notebook market





Quality of supp Would you buy the product again?



RESPONSE BASE: 32 USERS

Compaq's LTE Lite 425C

OVERALL SCORE: 75

7.5

uld you buy the product again?

RESPONSE BASE: 40 USEPS

By Kevin Burden

The notebook market has bee a battle royal - roughly 100 vendors are now fighting for their share of the spoils. Market reearch firm Frost & Sullivan, Inc. said it expects notebook sales to make a sizable 24% increase this year to 2.7 million units.

In the Buyers' Scorecard survey on color notebook computers, IBM ThinkPad 700C came in as the leader in the user satisfaction ratings with an overall score of 79 Both Toshiba America Informa tion Systems, Inc.'s T4400C and T4500C SX and Compaq Computer Corp.'s LTE Lite 425C systems took second-place honors, achiev-ing scores of 75, followed by AST arch, Inc.'s Power Exec 4258L

BM's ThinkPnd has been avail

able for less than a year and should continue to build mark entum. The ThinkPad's color display and battery life topped the her systems in user satisfaction Users also seemed to be taken with Its joystick cursor control and its docking station capabilities. But the lack of a Personal Computer Memory Card international Asso ciation card in the 700 and its early obsolescence by the introduction of the 720 had many users wishing they had delayed their purchase

plans a few months has ignored the desktop PC market to concentrate solely on portables. The company has managed to ntain at least 20% of the market for several years. Its T4400C

and T4500C notebooks were awarded high scores for screen clarity and readability. However, many users said they would prefer

a larger display. Toshiba's systems also so

high in durability, equaling the ThinkPad in that entegory. While Compaq's brand name and reputation can lure potential buyers, the quality of its support can be enough to land them. Re-spondents said Compaq's service and support for the LTE Lite 420C

has lived up to the company's reputation; the Compaq product carned high satisfaction marks in The LTE fared well in many aras. If the model has an Achilles' beel, it is its battery life. Users we it the lowest rating among the or rivals for battery life, a crucial

notebook feature which on this model can be monitored on a AST's Power Exects priced to attract users, and its power and per-formance helped it to the highest satisfaction ratings in value for the dollar However, it scored be-

low the other systems in overall re-Buyers' Scorecard records users' satisfaction with their in-stailed technologies. Users as-signed 1-to-10 ratings based on heir satisfaction with their noteoook computers in 20 specific cut-

All categories were factored in to the final scores. The scores for each product in the seven most important categories are listed in the

METHODOLOGY
User names were obtained from nonvendor sources. First Markot Research Corp., an independed: markot research company in Austin, Texas, conducted the survey and tabulated the results. The nse base was t41.

action with their installed produ Users rated their and were not asked to compare or rate one product directly against

To compute the overall score for each product, we performed the following steps: 1) Multiply the product's score in the first calegory by the user importance rating for that category to obtain the weighted score. 2) Repeat the process for all remaining categories. weighten score. 2) Repetating figures for the average weighted score.

4) Convert the average weighted score to base 100; the ratio of the average weighted score to the average user importance is equal to the ratio of the overall score to 10. Numbers are rounded off where

Computerworld thanks the following individuals and firms for their assistance in preparing this Buyers' Scorecard: Computer-scorld Database Division; Janet Cole, Dataquest, Inc.; Richard Zwetchkenbaum, international Data Corp.

OVERALL SCORE: 75

old you buy the product again





7.9 7.9 7.5 7.1 7.0

old you buy the product again?





Maryfran Johnson Sonior Editor Workstations Mark Halper Senior Correspondent

Jean Bozman Senior West Coast Editor

RELENTLESS, DETERMINED, COM

Relentless in the pursuit of the latest breaking news in IS.

Determined to dig deeper and work harder to uncover the stories that matter most to you.

Committed to the highest standards of excellence and integrity in journalism.

Focused on bringing you the IS information you need to know, when you need to know it.

Driven to cover it all — PCs, workstations, mainframes, client/server computing, networking, communications, open systems, languages, and more.

These are the qualities that distinguish the editors, writers, designers, and production staff of *Computerworld*. And they are the reason *Computerworld* is the newspaper of IS.

Week in and week out, the people at Computerworld cover the world of IS in greater depth and breadth than any



Joanie M. Wexler Senior Editor Networking



Alan Alper

MITTED, FOCUSED, AND DRIVEN.

other publication. That's why over 138,000 IS professionals pay to subscribe to Computerworld. Shouldn't you?

Subscribe to Computerworld today and you'll receive 51 issues packed with everything you need to know to do your job better. And get an edge on the competition. Plus, you'll get our special bonus publication, The Premier 100, an annual profile of the leading companies using information systems technology.

Order today by calling us toll-free at 1-800-343-6474. Or use the postage-paid subscription card bound into this issue. And get your own copy of Computerworld.

Then you'll see how a few relentless, determined, committed, focused, and driven people can make a difference.



The Newspaper of IS





No, it's not magic. It's Dell Ready Ware." Buy any Dell' system, and we'll install your software at our factory. (As if you didn't already have enough reasons to buy from Dell.) So the (As it you man t already have enough reasons to only 10th LPLL) 50 time you spend installing applications for your users can be spent doing mote important things. Like your job. Or maybe even eating your lunch. And with over 80 competitively priced popular applications for you to choose from, you'll be able to spend your time selecting all of those

software applications instead of installing them. No matter how many applications you choose, we'll pre-load your

Just a sampling of the many Dell systems available with ReadyWore system with all of them for just 15 bucks. Not \$15 per application. Or \$60 per system like some dealers can charge. One \$15 installation fee gets your system ready to run. And with ReadyWare you can save the time

and expense of multiple P.Os by ordering your system and software with just one purchase order to Dell. That's right. You can get all this from Dell. The \$2 billion Dell. The FORTUNE 500° Dell. The



third largest PC maker in the world Dell. And hore now the we'll-load-all-the-applications-that you-want-for-only-\$15 Dell. All you have to do is order MS-DOS 6.0. Microsoft Windows 3.1 (for Windows applications),

and your ReadyWare choices when you order your systems.

Then get prepared for pre-loaded systems that totally blow away the competition. And that pile of "to do" notes on your desk.



Apple's PowerBook 180: Easy-to-use notebook a hit, although short battery life frustrates users

PowerBook 180

rworld's Firing Line is an evaluation based on interviews wit sees at corporate and educational installations. The product

- The high-end Apple Computer, Inc. Power-Book 180 is lauded by evaluators because it is easily configured, easy to support and popular with users.
- Evaluators also said the PowerBook needs a longer battery life and is a bit more expensive than DOS-based systems.

rams, including Word and Excel.

This evaluation was prepared

editor and publisher of "The Hartsook Letter" in Alameda, Calif.

Notebook computers generally

or Claris Corp.'s Claris Works.

Firing Line evaluators included senior information systems managers from a major metropolitan university an entertainment agencx a computer hardware manufacturer and an international busiss consulting firm.

quisition and support of more than 1.700 Marintosh PowerBooks. more than half of which were PowerBook 180s. The remaining mix ncluded PowerBook Models 140, with the aid of Pieter Hartsook 170 and 165C. In addition, a small number of PowerBook Duos were deployed by these managers.

The applications installed on these systems generally included a suite of Microsoft Corp. protown or across the ocean — gener-ally mandate that notebooks be of isble construction and sound evaluator said, "Notebooks, in neral, are more likely to be used than desktop systems. So lability makes more of a differ-

> Although the PowerBook 190 did not survive an accidental "baseball bat test" that the consulti evaluator witnessed, all eva tors agreed that the PowerBook rable and reliable during the last year. The 3.7 rating reflected problematic quality control during ini-tial manufacture of the Power-

Other systems were equipped with the less powerful (but perhaps Book line. Consultant: "Other than poor fropping the units, we haven't had too many problems."

equipped with custom software Entertainment firm: "So that varied among the sites. For took one to the beach and got sand the most part, this software was in the disk drive and keyboard." designed with databases and/or University: "Poor-quality DOS and Windows notebooks have s telecommunications in mind.

higher failure rate." Compatibility

Compatibility with existing Maci tosh software did not seem to use a problem for any of the alustors. With only minor extions, both off-the-shelf and in-

System 7.1 operating system rather than to the PowerBook 180. The alting evaluator said some in-

Consultant: "We had a few pro ms related to System 7.1." Manufacturer: "We didn't run in to any surprises, and our software suite ran as expected."

former on the road and the d top, the evaluators said they were concerned about the short battery life of 45 to 90 minutes. That crit cism came from all of the evalue ons of PowerBook users. Consultant: "Battery life is mir

Entertainment firm: Our users say "it should get you from L.A. to

Technical support In most cases, the evalu

The manufacturing and ent

3)	Consolling See	Entertainment fires	University	Competer hard- were firm
Using PowerBooks since	1992	1992	1991	1991 1
Number of PowerBooks in use	1,000+	200+	200+	300-
Standard configuration	BM SYTES RAM, 12008-SYTE NASO DISK, 14.4K-SYTE MODER	EM-16M SYTES RAM, 120M-SYTE HARD DISK, 14.4K-SYTE MODEM	BM SYTES BAM, 12000-SYTE HARD, DISK, 9.6K SYT/SEC. HODEM	BM-16M SYTES RAM, 120M-SYTE HARD DOSK, 14.4K-SYTE MODEM
Primary use	ON-SITE CONSULTING	CLIENT TRACKING, US	ACADEMIC	SALES SUP- PORT, CUSTO- MER SERVICE
Desistop environment DOS/WINDOWS		80% Macin- Tosis, 20% DOS/Wisdows DOS/Wisdows		15% MACIN- TOSIK, 75% DOS/WINDOWS, 10% UNIX

Evaluators said the PowerBooks have become more durable and reliable in the past year

CONTINUED FROM PAGE 145

nt evaluators said Apple provided excelient technical support and repair services

by How do I send a fax? The vast majority [of our technical support) is faxirelated."
Manufacturer. "I have one person manning
the PowerBook belp desk. That's less than we



Ease of installation
Like other systems in the PowerBook line, the
150 includes built-in support for networking
using the AppleTalk protocol. An AppleTalk
port is included on all PowerBook. In addition,
a Small Computer Systems interface (So
port allows connection of the PowerBook to peripherals asually related to desktop systems, such as CD-ROM drives, tape backup devices

s said that using these devices sed few problems. Support for extra hardware devices is in-cluded either in Apple's System 7.x operating system or in easily configured programs deliv-

ered by hardware vendors.

Entertainment firm: "What impressed me was the multiprotocol support. Configuring it

University: "A pleasant surprise was config-uring Mace using a SCSI Ethernet adapter." Manufacturer: "We chose [the PowerBook] because of the installation relative to Win-

Support cours

Because the PowerBook 180 runs the same soft-ware as all other Macintosh models, evaluators said support costs were distinctly lower than that of equivalent DOS and Windows systems. They attributed other support reductions to the intuitive Maciniosh user interface, which they said was easier to use than Windows. University: "There are less support costs in

the PowerBook than in DOS notebooks." Manufacturer: Support costs might go up "because most PowerBook users are sales reps. They need more support than engineers."

Ease of use

The evaluators agreed that the PowerBook 180 could easily be adopted by novice users.

They said the Macintosh interface insulated sers from operating system arcania and was fairly consistent across

Entertainment firm: 'It takes about half an hour to get a user up and running. That's about a 10-to-1 ratio" compared

University: "You get re from PowerBooks than from other notebooks."

PomorBook allo fastures

Back-It, active-matrix dis-with sil-level gray scale. III Priced at \$3,699 with all bytes of BARL and Bolli-byte hard disk.

bytes of random-access memo-ry and an 80M-byte hard disk, the PowerBook 180 is quite a bit more expensive than intel Corp. 1486-based notebooks.

The evaulators responded to PowerBook pricing with only average ratings. University: "It's in the balipark." Manufacturer: "You pay

a premium for the Power

Despite the higher cost of awnership, the eval-uators said the PowerBook provided more val-ue than equivalent DOS and Windows systems. They cited lower support and training costs as justification for the higher PowerBook cost. justification for the higher rowersook cost.

Entertainment first." I have fewer calls to the
help desk. Configuration, training and support
are less. I can have fewer technical people."

Telecomputing unefulness The evaluators said the PowerBook 180 was a telecomputer's dream. They said few, if any,

ems occurred with even the most novice telecomputers. They said the biggest telecom-puting problem was finding and using hotel ed little need for it. They did say the "balloon room telephone jacks.
Entertainment firm: "Our agents love it, but Help" facilities included in the System 7.x np-

erating system vastly reduced the need for printed documentation. They said Apple's onthe irony is that the quality of [a third-party] fax has sold more PowerBooks than anything se Help was generally sufficient for most us-Entertainment firm: "Our agents don't want [documentation]. They don't want anything to University: "The remote networking (sup

portl is very useful. That is not being done with DOS laptops. Manufacturer: "Apple Remote Access and AppleTalk give the ability to dial in and have network services. You don't lose any function-

ality" over a deaktop system. Written by senior editor Garry Ray.

At a list price of \$3,699 when equipped with 4M Apple responds

University: "Most PowerBook owners dun't read the manual."

Entertainment firm: "Everything is built-in:

Documentation
The evaluators had little to say about Power-

Book documentation, primarily because users

The following are Apple's responses tunus raised in this evaluation:

Battery life: For all computer users, bat-tery life is clearly a top priority. With this in tery life is clearly a top priority. With this is mind, we have constantly evolved our battery technology since the introduction of the PowerBooks. We have moved from 2.5 amphour to 2.9 amphour batteries and have developed the Ever-Watch battery-exing technology. We continue to explore new

possibilities for further improvements.

Pricing: There have been some very aggressive pricing moves from the PowerBook group this month. We lowered the price of the entry-level model by 25% and the price of the PowerBook 180. In addition, the Pownot standard on the DOS platform: notwork-ing, andio, QuickTime and file sharing. Con-tomers are buying a very complete portable solution and know they will not have to in-

solution and know they will not have to in-vest in mer final reast action too.

Color displays: We introduced the pos-tion-matrix color Powerfloot. Efficiently and the matrix of the the the thing of our cus-tomers were interested only in active san-trix color technology. The active santrix Proverbook tile! one

p availability: PowerBook demand has been tremendous: 600,000 were sold in the first year. While we anticipated strong de-mand, this level of successe is musual for a new product. As a consequence of high de-mand, we have made changes to our manu-facturing cycle for PowerBooks to Improve availability.



o Sumart Sants, Nr.
o C. E. Sants, Inc.
o mel Atlantic Corp.
o Surgan Sharaming Corp.
o Sung Warner Corp.
o Sunday Laborathy

The Courage to Pursue a Vision... The Wisdom to Achieve Success

The Computerworld Smithsonian Awards honor excellence in information technology for the betterment mankind. Price Waterhouse, a leading IT services provides proud to sponsor this program honoring the tradibilization is also do not not provide the program and program to the computer of fields.

To those who envision a better way and who exhibit the perseverance and insight to carry a digum to fruition

W- aluta you

Your accomplishments shall be permanently enshirms at the Smithsonian Institution so that future generations has better understand the evolution of information technology. Your steadfast determination is reflective of man's ability to reach beyond imagined dreams and turn systom into reality.



Category crimines

Braumes & Related Services

Charles

Control of Control

Finance, Insurance & Real | loans 1 | NASD | V | V | 1 | 1 | 1 |

.

Science

Franspertation

on Jawy Com

- Ungaling ... 10.

(Sporting) to by the stand of them.

Integrated Committee Anna the second to 20

tramatic and the second of the second

in storage solution is a strong of the

sames to me capacit among to be a consecution of secund

on the manufacture of the manufa

, and community association is a mass mass. Better s

The state of the s

e labality, plus its over a second or a second

 $= \{I_{-i}, i_{mi} \in Series | H_{i} \mid perfore \}$ $= e^{-imh \times i}$

× # 7271 MC2. Ext. MMI60

and stronge systems harp some or and



Get Free Just fill out these cards and drop them in the

Just fill out these cards and drop them in the mail to get FREE information about these valuable products. To place your card on this page, call 800-343-6474, x757.







Don't buy another 3390 until you've tried Innovation's FREE DASD Management Report Program...FDRQUERY Let FDRQUERY Put You Back in Control of Your DASD

For further information or a FREE 90 Day Trial of FDR*/ABR*...

Just Fill Out and Mail this Cerd, Cell (201) 890-7300 or Fax (201) 890-7147

For More Information

FREE No Obligation 90 Day Trial and

For More Information Press to Obstaction NO Day For law of PRESE AND SQUARED NO DAY For law of PRESE AND SQUARED NO DAY SQUARE

CASE

FREE ISSUE OFFER!!!

CASE TRENDS genera as aware transacr statute on some merciones. No other computer magazine offers you more comprehensive it in-depth information on how state-of-oth-art orderant development rectuols, togeth care for good to they made transport and particular applications of the comprehensive and obstations across all hardware patterns. Throughout the year we cover:

ASE ClientSel
Phjort Oriented Development Open Syn
Sylverore & GUI Application
Server& & GUI Application
Serverant & Guil Application
Serverant & Guil Application
Serverant & Guil Application
Serverant & Guil Application

ClientNerver Development
Open Systems Savangies & To
Software Quality & Testing
In-depth Product Reviews
& much More...

YES!

issee PREE. If I like it, I can subceribe and recovery 9 more inseet, includely your Assuad Predict Rayer Gaide, for just 157 to 25% excising off the barrate of \$49). If I'm not completely satisfied, I can return your bill marked "cancel" with no obligation. The PREE issue will be mine to hexp.

FIND SOFTWARE

ANSWERS FASTER
BECAUSE DDC
YOU READ LESS...

What took you five minute now takes one minute.

The illustrated instructions put your fingers or the correct keys-last. Vital you what to do in five

No nemation or exposition. Just "Press this-type the" illustrated comands.

Office Managers
osi- increase production to
the gallon-load. Their
ds. why we made 32 guil



Information! LEE Information about these

Place Stamp

NO POSTAGE

NECESSARY IF MAIL FO

WH-17

NO POSTAGE NITED STATE

INNOVATION DATA PROCESSING

To place your card on this

275 Paterson Avenue Little Falls NJ 07424-1678 BUSINESS REPLY MAIL

MACKINNEY SYSTEMS

2740 S GLENSTONE SUITE 103 SPRINGFIELD MO 65890-0456

المراط الماط والمراط المراط الماط الماط الماط

POSTAGE WILL BE PAID BY ADDRESSEE

BUSINESS REPLY MAIL FIRST CLASS MAIL PERMIT NO. 24 SHREWSBURY, MA

Name Company Marin City Phone (# of UPSs to arrealy

NO POSTAGE

NECESSARY I

MALED IN THE

INTED STATES

CASE TRENDS

PO BOX 294-MO Shrewsbury, MA 01545-9955

BUSINESS REPLY MAIL

أولوا والمساول والماليان والماليان والماليان

Marriellahdialahdidahdialahdialahdialah

Riblishing Dept.J-61, 14 E. 38 St., NY. NY 10016 8.95ea.

IS-17 P.48



POSTAGE WILL BE PAID BY ADDRESSEE

STERLING **SOFTWARE**

Richmond, Ohio 45157-9980

البارسال أولول لولولي المارا ليارا المساليا المساليا

RE-ENGINEERING -REPERCUSSIONS

Business managers, end users and IS staff from Connecticut Mutual, Agway and Kodak speak

Kodak speak candidly about how re-engineering has affected their jobs

— and their lives

JITTERS Resigneeing right have to seekful. Dut it server of logical directly laber to the common band out of logical directly laber to the common band out of logical server to the common band of logical server logical server to the common band out of logical server to the common ba

surce Price Materhouse, Philedelphia

CONNECTICUT MUTUAL



Re-engineering can create massive upheaval for a firm, say Connecticut Mutual IS chi - Selter (left), and year Enthlery Prop (center) and business manager Karen Wethere

> By Julia King Special to CW

Two and a half years ago, paper plastered the desks of the 1,900 employees at the home office of Connecticut Mutual Life Insurance Co. in Hartford. A task as seemingly straight-many and the control of the control of

forward as a beneficiary change required no fewer than 22 human interventions. Assuming no one lost the paperwork or minified copies, the process took up to six days.

niliton dollar re-engineering initiative aimed at moving all Connecticut Matsual divenses, common computing architecture known as One Image. Since Jannary 1991, the One Image project has involved redesigning work flow across a language of the Computing Com

Since January 1991, the One image project has involved redesigning work flow across a department, implementing imaging technology enterprisewide and furnishing all sprise with "command centers" — network-based PCs that can access a single database of quadricular transfer of the properties of the pro

In Depth: Re-engineering repercussions

RE-ENGINEERING'S IMPACT AT CONNECTICUT MUTUAL

RAD

Connecticut Mutual

CONTINUED FROM PAGE 149

Another key element of the \$12 billion Another my comment or the 22 counts impany's One image program was the placement of the traditional manage-ent hierarchy with cross-functional aims of workers. Those groups are re-onsible for streamlining old business ee or architecting new ones. In ided on these teams are application developers and other information sys-tems personnel who report not to a cen-tral IS organization or chief information officer but to a division vice president.

So far, re-engineering has yielded pr So har, re-engineering has yielded pro-netivity gains of 20% to 60% across all partments in the company's individual is insurance division. Additionally, the vision has recouped its \$5 million capital investment in the One Image project in 18 months — six months absed of

Achieving the mins meant sig-nificant cultural changes for IS workers. First, application devel

were all

opers and pro-PRIMERETS WORK reassigned to and "navigator" positions. These new

the re-engineered tional IS chief at the

"As we get more into object-oriented and reusable code, the skill of raw coding is less necessary. [18 workers] need the ability to be intuitive, think spatially and igute data to end users," Scites ex-

Creating cross-functional teams in which all members have an equal say in how to accomplish work is one of Scites' biggest challenges, abe says.

At the beginning, there was tension d a clinging to hierarchy," she recalls We came in and said, 'We're going to repeer the whole individual life line. and we need your support.' Because it was uncertain what all of that meant,

even to us, people were afraid. We were all afraid." Open communication and ongoing training programs were instituted to belp combat the fear. In 1991, the division

the employees with 15,000 hours of ining in Windows, PCs and imaging: Last year, the figure rose to

25,000 hours. Other comm cation activities included regular newsletters, infirmational videos and 'companyored tech-

nology days when workers could experiment with different hardware and

challenges associated with the re-engineering program "have energized and excited people as much as they have ever been in their careers." Staffers feel good about their part in

iping the company's 1.5 million policy-iders. IS centralized policyholder in-

Costomer service leen Pogg used to spend a good deal of ber working rifling nets, only to find incomplete paper-work. "I don't know" was ber

Connecticut Mutual agents and policy-boiders called to ask. Her desk was "a mountain of paper, a real mess," she says, A backlog of three, four and even Today the paper is gone. Poggnow has electronic access to all policy data as

well as to legal documents, letters and other correspondence. Upon arrival in the compa ny's malir

those paper docu ents scanned into a corporate database. Looking at her screen, Pogg onn see, among other things, who in ber department or in another part of the compr

has worked on a customer file.
All of this has made her work easier. It has also done wonders for her mental bealth

On the positive side, Seites says the "It feels good to go home at the end of the day knowing that I got a lot done," Pogg says. "I'm a intiess stressed out. I'm not going from drawer in drawer or deak to deak to find something all the time. I can do all my work myself, and I know evcrything I need is right there in my comwith widespre worker an over losing job cents to imple people to be en-

when they are out los ing their jobs, Wetherell's staff has decreased from 250 people in October 1990 to 184 today. While attrition accounts for a portion of that drop, other employees were put out of work by imaging technology and re-en-gineered work flow:

Cue

Service

As the company restructured jobs, Wetberell says, she found that the best way to approach colleagues was directly. If we planned to convert files to opti cal disc, we would tell file clerks before we went in that their jobs would be gone in six months," she says. "By doing that,

we developed trust. Empinyees knew they wouldn't be taken by surprise. They were thankful to us because they could prepare and seek niher employment." Personnel cuts, along with a 665-sq-ft

reduction in office space and the climi-nation of 110 five-drawer file cabinets and costly color-coded paper forms, have ide it much easier to bring her dep ent in on budget, Wetherell says. At the same time, the combinati

rw technology and re-engineered work rw has boosted productivity 35%. Problems are now resolved in on

phone call rather than pending for weeks, "she says.

For years, farmers placed orders at any one of 600 Agway, Inc. stores, which in turn submitted them to the appropriate mill, plant warehouse. The result an endiese paper flow among Agway's ciall, manufacturing and distribution facilities. These sites were lling one another, all to serve the same cus-

ing points to 15. Now, rasher than going to the stores, farmers call (809) GO-AGWAY to order all feed, crop and seed supplies directly

from regional service conters.

Using an Interfut compoter system that builds on the point-of-sale system used in the retail stores, customer service specialists have PC- and servatural-based access to customer histories, customer information and other data stored both locally at the service conters and on the cooperative's Amish Corp. mainframe.

The company opened its first regional customer service central to the cooperative will be operational by mid-summer.

CARLETON -"Existing are far from

or satisfaction with the new ordering scheme, the systems supporting it are inefficient. This remains one of the IS department's chief re-engineering bur-dies, says IS chief Carle-ton Whittemore. From a business per-

spective, Agway knew it had to move ahead with its efficient." re-engineering plans to stem two straight years of

declining revenue, he says. But this required oving to the regional service center concept before the IS group could develop and put in place new systems and tools. "It took a int of creative magic on the part of IS

ecople, who have worked inng, long hours to tie together a system from the consumer group and two other systems from the agricultural group. But what we have is a conglomeration of existing systems that are far from efficient," be explains Meanwhile, the IS department is being over whelmed by demands from other Agway busi-

While phone surveys of 80 farmers each week indicate a high level of custom

ness units. Agway's consumer and energy divi-sions are also re-engineering. Also, the coopera-tive is looking to replace separate financial and control systems with one accounting system.
At the same time, the 125-person IS department is going through a sort of culture shock as it makes the transition from a separate Agway

profit center to an internal support organizat "IS has a tremendous amount on its plate,"

Whitemore says.

But there are positive results of the restructor ing. "IS people are not always on the defensive, having to lustify why something is late. They are starting to be looked at an part of a feam."



► Anne Poe misses face-to-face contact

In 1988, Eastman Kodak Co. set a company record by rolling out the world's first disposable 35mm camera just 38 weeks after the start of design work. Known as the Fling, the camers was the first Kodak product designed and manufactured by a project team employing colcurrent engineering principles; three-dimensional, solid-model computer-aided design (CAD) technology; and a single database of development information — the three-basic ingredients of a re-engineering effort that has now spread throughout

mer Products Division. Prior to Fling, the company produced cameras and other Kodak products in a se-quential, step-by-step manner from design to tool maker to factory floor. When prob-lems surfaced, backtrecking would been.

Earlier this year, Kodak introduced the Cameo, a pocket-size, motor-driven 35mm fixed-focus camera. It is the 10th in a series of products developed since the re-engi neering program began five years ago. From design to manufacture, it took 22 people

23 months to produ Prior to re-engineering, the same product would have taken more than 60 people sen three and four years to get out the door.

The single greatest sidvantage reengineering has afforded Kodak engineers is a consistent source of information, which enables each person involved in a projpower of ect to know precisely how his

work impacts oth-

ers on the team. according Woody Noxon, director of the Systems Engineering Division and man-

Agway's customer service

ager of CAD technology. 'in the serial engineering pro signs would be thrown over the wall to

the next department, and if there was a change, it had to go back over the wall the other way." Nome explains, "But now that CAD tools and all the information around a product is available to anybody on the design team, people in different locations can use the same go at the same time, and they all know the reistionship between the parts and the overall product."

The effect, Noxon says, has been that each person's work is available to everyone on a daily basis. "The power of the team becomes very strong very quickly and comes together around a common goal," he says.



istakes

put a lot more thought into the pr

up front. There are 196 parts to the Cam eo, and with the very first parts I put to-sother, I built a camera that worked. That as unbeard of five years ago. Now, we don't make the mistakes we used to. Learning to "trust the technology

"CAD is not like a drawing boa here you can look through vellum and see what you've got," Spencer says. "At first, especially in manufacturing, there were no 'drawings' and no signing off on drawings. Instead, manufacturing had to go into the database to do their tooling

BAD

eer and project mager on the Cameo, draws a sharp contrast been life before and after Kodal nd CAD and

fore, we'd be bilster-packing

In this sense, Speacer says, the tech-nology has placed an additional burden on designers to be good at technology as

well as de One of the things Spencor deem't m at all about the old way of doing things is the finger-pointing that went on between artments. "Now, it is the team that reeds or falls."

As Ray Lim sees it, it is only

Kodak 270 of his staffers with CAD to

pals with links oth model and tool shops at Kodak.
"You get better designs with CAD, and the dramatic success of our new prod note has made people anxious to get on

to the next project," he notes. But it wasn't always that way. "We h a lot of people that had spent their whole career at the drawing board, and it was a difficult transition for some to throw

way their boards," Limoges says. Younger people, meanwhile, ada much more quickly to the technology, but they lacked design experience. The solution? Team younger design-

ers with senior staffers, who, Limoges says, generally took about eix months t get acclimated to the CAD system.

We did have to take delivery pre sures off senior people in the early stag es," Limoges notes. "But when they saw their designs directly transitioned into ty became convinced of the val

strong."

staff members are primar ily retrained employees from other parts of the company. Anne Doe, a custive, used to be a store clerk. She says she likes her new job but misnes being outdoors, especially during the Vermont Last year at this time.

Doe was loading and unloading trucks, waiting on and "doing a little bit of everything" at Agway's farm center store in St. Albans, Vt., sbe says.

Today, Doe, who is berself a farmer, still works in St. Albans but at Agway's regional service conter. There, she situat a desk in front of a computer terminal, processing phone orders from furmers. Being inside all year around is about the only

thing that really bugs me," she says of her new

Because the computer system provides her with previously unavailable background information, such as the kind of feed bought in the



past, herd size and even the farmer's spouse's name, Doe says she has been able to more knowl-

ably serve customers. But like Whittemore, she says the computer system supporting the regional centers is

inadequate. We need more storage because now we ca only go back to the previous five orders. But for some of the higfarms, five orders represents only a week's time

"We also need more training," Doe adds. "We have a mainframe system, but as they add new programs, we don't get training. It's kind of hant

'We're

RE-ENGINEERING'S IMPACT

Listing the benefits of re-engineering comes easy to Richard Stowe, who, as region manager for Agway's feed business, al so oversees the St. Albans customer service hub. "The No. 1 benefit is that we've made it easier for customers to do business with as rmers can call and talk with essent

the same people every time." Slowe says,
"We're also more competitive and more
responsive to customers' needs. Instead of ng through one, two or three people to an answer to a billing problem, each

BAD

m. Before, a compla could take several days to weeks to re-

es been a pro Stowe says. 'The want to know why and the need for

To your customer, corporate headquarters is here.

A field office. A branch. A retail location. To a customer, that's your company. One small part of the whole. Which doesn't give you a whole lot of leverage at the point of customer contact.

But now, a powerful new approach to business can leverage your entire enterprise at each of your locations, resulting in unparalleled customer service. It's brought to you by Unisys and captured in one word—CUSTOMERIZE.

When we customerize your enterprise, we extend the full capabilities of

Cus-form-e-22e \ \times \ \times \ \times \ \times \ \ \times \ \t

your information technology out to the field, where your customers are. Where business is generated. As the world leader in customerszene business, Unlsys



shapes your information strategy to serve customer needs for efficiency, timeliness,

UNISYS We make it happen. access to product information, and more.

Whatever your business, call us at 1-800-874-8647, ext. 11. Ask how Unisys can help CUSTOMERIZE your company. And put your business objectives squarely on the map.

navenument surroom are a service mark of Union Corporation

Computer Careers

Interested in DATA SECURITY? Beef up sales skills.



THE JOB OF data security manager isn't what it used to be. These days, bolding this title means you spend most of your time roaming the organization, and it of-

ten entails much higher level tasks than changing the system's access code. To survive, I tell myself to learn to love change. You're in the data security business, and if you don't love change, you'll

I'm a certified inform curity professional and a data security manager at a Texas bank. I have almost 10 years of experience in data security. much ol it in the banking and financial

In the past, security managers often doubled as data security administrators. They spent time entering code in a security system, checking it and submitting it for overnight processing Now, most of these activities are handled by a data security technician. In my company, this person reports to me, as does the disas-

ter recovery manager This change in responsibility has freed me to oversee corporate security standards. I write policies, procedure documents, mission statements and requests

curity program. I visit companywide staff meetings, deliver presentations and gather information about security challenges posed by new technology

Education is a big part of the job. Most security professionals realize education is the key to effective security. If we spend lots of money on access-control technology and do not educate our staff. we've wasted that money. And excellent negotiating skills are required becau almost no one wants to set up another meeting just to bear about security

At my previous company, I used an unual negotiating tactic. I had difficulty getting one particular department manager to allow me to talk with his group. I called, wrote letters and did other things to get his attention, to no avail. Finally, I sent him a Valentine's Day card that said, Forgive me lor whatever I've done invite me to one of your staff mee

ings " And be did Nobody wants to hear it

After putting in some neces pulling teeth, I have just enough time to research new technology. I must be knowledgeable enough to advise manment on security issues before new technology is brought into the company. After all, no wants to hear that the new server can't be brought up on Monday

data on it.

I worked at a host-to-host communications product. From a security point of view, I told them it was a dog, but they installed it anyway Afterward, we discovered that any vent some of the product's key security measures. We had to quickly write add-on code to prevent this, and fortunately, nothing bad happened. This emp to me bow important it is to discuss se curity before, not after, a product is in

Talk, talk and more talk

I've loned that one of the best ways to educate myself about new technologies is to talk with my peers. Computer secu rity prolessionals tend to be more isol ed in their organizations than other IS nals and need to seek one an

If I do all of the above, I just might keep in tune with my customers. If they're bapov. so am I. Right now, the biggest this my customers want is a product that all lows a single user ID and password for all of the computing platforms in the or-ganization. Ask any data security user what they bate most about security, and you'll hear: "We're always being teld not to write down passwords. But how do we

ber all of them when we have so many?" Single sign-on is the answer Look for security products that pron this, and your customers will love you.

Blackley is a data security manager at a Texa



Staying Competitive Isn't Easy

With your competitive environment constantly changing, you need the freedom to adjust your staffing mix without jeopardizing operations. Robert Half Information Systems can help you accomplish all of your information systems staffing objectives. We'll help you make the necessary refinements to

maintain a productive and confident workforce. Robert Half Information Systems is pleased to offer you a FREE booklet -

Competitive Information Systems Staffing for the '90s. This booklet explores the full-range of temporary and permanent personnel arrangements offered in the information systems area.

To order your FREE copy, call 1-800-458-5700 Ext. 103



We don't follow standards.

We set them.

DW deletizate, to become that Base Administrators bette Base Administrators contesting of DRA and Data Analysis practices, gamed in a high volume as processing service results, SCL DS, ORACLE, DRA SYRASE, Bases, DRA SYRASE, SCL DS, ORACLE, DRA SYRASE, ERADAY, A Mean of Syrasia as DRA with data analyst knowledge to the service development background.





fier a highly competitive salary and a compete benefits pecings. For confidential come in please FAX or send your resume to Hismannes / GUR, Chrysler Bystems Lessi Delibrook Terrace Towar, One Towar Ltd. 2006, Oathbrook Terrace, I.L. 89181

FAX: 708-574-0138 COLORADO

You are looking for quality consulting operatures is your area. The Computer Merchant, Ltd., with offices nationwide and the recognised source for consulting professionals to the Fortune 500, knows about the opportunities in your locale. Software professionals with at least three years of expertise, contact us at the location nearest you or fax your resume to us at our

corporate headquarters. + AS400-LANSA · ORACLE, C · ASSOCIATE · VAX. C - NI . DATAFASE · UNIX/JAM/ORACLE - KJ · POWEREUTLDER

· HP3000 FORTRAN . PROGRES P/As • MF COBOLICIES · STRASETNICKES · ENEX/POSIX . PL/1 - BANKING · GUVWINDOWS SDX • NUMPS . TPF P/As * SMARTSTAR

· RDR. C



THE COMPUTER MERCHANT, LTD. CORPORATE HEADQUARTERS 80 Washington St., Stdg. 3. Norwel, MA 00061 8071 808-8000, FAX: 8071 879-4712 LOS ANGELES ATLANTA 180 Newport Center Dr. 625 North Michigan Am Safe 180 Chicago, IL 60511 Newport Beach, CA 9060 G122 751-4299 (704) 770-4255

THE OLYMPIC CITY

GUI DEVELOPER

THE NATION

stems Lessing Inc. (CSL), a m

We requires minimum of 2 years of Windows, 5DK, C++ or national GUI development. Powerbulder reportance is a plan, but not requirement in position also requires the ability to work with a small team, is share technical safe and contribute a high degree of creativity.

CHRYSLER SYSTEMS LEASING

Can **you** relate?

su've beard it many times: If you don't want to be left in the dust by distributed computing, you'd better acquire a rough understanding of relational

sees. But where do you begin? Of course you want to con ur energies on the products with the est prospects, and according to George wa, president of Database Solution in Mariton, N.J., that means products that are truly relational and have embed

ded SQL. Beyond that, the choice of products will largely deed on your devel-

arth-generation languages (4GL), time Loarning SQL is straightfor ward. Once you know

"you can pretty much work your way rough any relation Rod Prince, director of technology at Na-tional Diagnostic Sys-tems, a medical ser-

vices consultancy in rlingame, Calif.

reading SQL manuals

age to learn its quirks. Cobol programmers who have had tit-tie or no experience with a graphical us-or interface (GUI) or the SQL innguage would probably do best if they started from Dialogue Systems. It is a GUI-base language that makes limited use of ol

with a product such as MicroFocus Cobol iniques into makes minice used to be inject-oriented programming (00P) techniques and can be used as a front end to a database server environment. But be warned: Price can be an inhibitor. Micro-Focus Cobol costs about \$1,500 per copy. concepts, analysis recommend that you

work with Microsoft Corp.'s Access or orland International, inc.'s Paradox. nuse these products combine a GUI-ed, OOP-oriented development envi-ment with the database itself, you can kill two birds with one stone and grad ate more easily to database server prod-

Take the plunge ers may want to age into database servers, says Tim Harmon, workgroup computing strate-gles program director at Meta Group, Inc., a Westport, Conn.-based consulting firm. Products such as Oracle Corp. s Orsele, Sybase, Inc.'s Sybase, Informix Corp.'s Informix and SQL Server (marted by Microsoft and Sybase) were de

Database servers must be married to a front-end 4GL development tool, such as MicroPoeus Cobol, Powersoft Corp.'s verBuilder or Microsoft's Visual Basio, which are used to write the appitions that are then ported to the d e. Visual Basic provides a co terface across all your Windows app tions, says Urban Cubbage, a pr ammer and technical instructor at Pr

As you get into the id pecific relational data

Paradox has a more

se it is

On the other hand, PowerBuilder is not a true OOP language, ce says, but it b

Goff to a New York Image

INFORMATION SYSTEMS

SPECIALISTS

HOGAN SYSTEMS OPPORTUNITIES ...

LOOKING FOR A CONSULTING FIRM THAT OFFERS A DYNAMIC CAREER PATH, STABILITY AND A FUTURE?

You should join COMPUTERPEOPLE. We offer 13 different sockwise training courses and we are the only organization as Plonda to offer Plannum lacknology DSC courses. Technology nerves forward — we help you move self- set. ement is in your future, you may have the opportunity to be in our first level ougenloopy development and one

manager program.
The occupational statisticy we other comes from bleng the largest firm a Plonia. Wa djoint here "subs" - we have people that STAY with use year after year. It consulting its comatting you are considering ..., consider COMPUTERPEOPLE.

IBM Mainframe • IBM Midrange • Unix Tendem • DBMS Software Products · Arthur Anderson Tools & Software



COMPLITERPEOPLE

We're high-tech, high on everyone's list and interested in meeting high achievers.

We've federal Express, and there's much excitement going on with all new technological changes. Changes on the leading edge that offer insired opportunities for the best and the bugbines. People who can not yimbe significant contributions on the irchnocal side, but whose con-niciones and leadership shifts are second to more. We currently have the owing positions entable in Memphis, TN and Colombo Springs, CO.

wwwg positions mallither in Mestignam, i'r was uureach ghraigh. William gygaraameriller Polipamamer. "Two in these years programmeria programmeriller Polipamamer. "Two in these years programmering coperating years on interprecession development programs of programs of the control of the programs of the programs of the control of the programs of the programs of the control of the control of the programs of the programs of the control of control of

ecessing as a Constantion Sprenge, Perchastical Advisor - Bachelon's degree/equivalent in Computer Science, sub, Engineering or Business. Seven years systems development exper-ture which trackeds five years in programming. Salls in one or more pro-naming languages used by Federal Express. Complex systems experience BM Operating systems or miscrobeocustom preferred. Experience in the which includes the years in programming, Sall in one or more pro-incide larguage under by Pederal Depress. Complex systems experience of the operating systems or microprocessors preferred. Experience in the call delays and development of misses dess processing projects. Strong in relations and communications skills, Salls regarded, the depth relations and communications skills. Salls regarded, the depth relations protocols. Analytical experience preferred. Premitaria polycochronized sectionalizing in referred for the opening and

EEDERA



Software Package Implementors





I select in operations, maintenance and training.
We have immediate openings for AS/400 professionals to support our expending worldwide methods of BM AS/400°s.

Intention of IBM 85/600°s. Bladdle Baset
Hands on manager to support multiple A5/400°s
hand Areals, norm Egot and Intenty operating
stable company developed in formal supplementary
stable contained in the supplementary supplementary
stable contained in the supplementary supplementary
supplementary supplementary supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementary
supplementa

is able to work storm. This position offers a very attractive potential TAX FREE salary, company paid housing, subsistence selevance, there is weather plan and a comprehen-tative complete produces. Future openings will exist in Fairfax, VA, Welnington, NL, and Jacksanvilles, FL, for service lovel 8/2 (400) Programmer/ Prolifers. Publishes required 1004 - 200 Freet.

All positions require a minimum of five years paid IBM midrange experience, total command of RPG/ 400 programming language and personal computer proficiency.

complaint posteriors, proposed posterior posterior proposed propos



COMPUTER CONSULTANTS MR



Company And Ad.

County Townson Company Compan THIS

SPACE FOR HIRE Call today

ta place your recruitment ad. 800-343-6474 In MA. 508(879-0700)

Looking for qualified computer professionals?

Look no further. More than 629,000 computer professionals read Computerworld every week. And you can reach oil of them or in the ones in your region — with a regional or national recruitment advertise ment in Computer Comess.

For more information, call Liso McGrath of 800-343-6474 in MA, 508-879-07001; or call your local sales affice listed below:

BOSTON: 375 Cochituste Road, Box 9171, framingham, MA 01701-9171, Nancy Percival, 508-879-0700. NEW YORK: Mock Center 1, 365 West Passoic St., Rochelle Pork, NJ 07662, Vole-rie Golbo, 201-587-0090.

WASHINGTON, D.C.: 8304 Professional HII Drive, Forfax, VA 22031, Kone Kress, 703-573-4115. CHICAGO: 10400 West Higgins Road, Sales 300, Rosenore, IL 60018, Parricia Powers, 708-827-4433.

LOS ANGELES: 18008 Sky Pork Circle, Suite 145, Invine, CA 92714, Barbaro Murphy, 714-230-0164. SAN FRANCISCO: 18006 Sky Pork Circle, Suite 145, Irvine, CA 92714, Bor-boro Murphy, 714-250-0164.

COMPUTERWORLD

Midwest

The second of th Marie Ty as a Ouga as absenced to the ser-ance of the series of the series of the series of the series to the series of the ser

DEVELOPMENT METHODS ANALYST also Public Power District has an immediate opening for recomment Mathods Analyst at its corporate collice in

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING

WORKS ... A late advertising close means you get quick response. Com-puterworld needs just 2 working days notice for your ad to ap-pear in the next weekly issue!

In fact, when we receive your materials or faxed copy for your ad by 3 p.m. the Thursday be-fore the Monday issue date, your ad will appear that Mon-day!* (Space reservations clos-ing date is the same time the previous day).

			but speck, and but, seeps		
<u>.</u>	Tue	Wed	The	Fri	Tech aupport provided for de
			Space & Materials Close 1	2	COLUMN TO THE PARTY OF THE PART
ite .					to accompanie in law of Bacteria PEC, (CO* companie in regard to up of or companie in the season of destroom system or fill in construction and Dath City Action, Action, GLM, Oct. Action, Action, GLM, Oct. National States
ider o	lesings may	very. Please	Woodward Ave. Am 415, De se 48000 Per A48000 player Patt Ad.		

14

b

n

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Ad-vertising, at 800/343-6474 (in MA, 508/879-0700).

COMPUTERWORLD There the marking conductors in all forces and



NEW CAREERS

Southeast

CSC PARTNERS:

People and Technology dvance Together

en skills and a prov to deliver large projects on time, within budger, at a high level of quality. (Dept. code PM)

BUSINESS ANALYSTS Requires 4+ years experience to include information strategy plus ning, bussien process design, bussiens area analysis, applica-tionesternals design, and imple mensation and consulting exper ence with one or more CASE products (IEW, IEF, Bachman)

esc.). (Dept. code BA) PROGRAMMER ANALYSTS Pruside nearms analysis, design, programming. Requires at lease 24 years of IBM mainframe, DB2 and CKS experience with strong structured programming tech-miques and at least I year in the

functional/design phase of sys-tems development life cycle. Desired background also includes AS/600, HP/UNIX and C/C++. (Dept. code PA)

serding in portnership with our people and climas, to much our goals together. We are CSC Pareners, someo-

ion in system migration and development, with a re-solution for moring and extending climits' expecta-tions time and APP APPER

We all sucred brease our people lane the resource, course paths, solid ensuing and shored commitment to help them more abused until confidence. It's this approach that has reached suc to grow фот a 3 ретоп compower to over that's 1,400.

strong maturesade We are now having people nomals note nomina death of experience and a Backeter's degree to work said our Fortune 1000 cheats on the tread range of applicat and technologies.

CLIENT SERVER
TECHNICAL CONSULEAVITS

Develop Client Server applica tions with the latest technolo-gies. Requires 64 years develo girs. Requires 6+ years develop-ment experience with a variety of Client Server platforms (UNIX, OS-/2, Windows and Oracle, /6/13, Strength in CASE, Tacle, GUPTA. PowerBuilder, Paradox and Object Vision are 2 plus. (Dept. code OS)

needs; however, if you are an experienced sources to femional with as

& Equal Opportunity Employe



CSC Partners
A Company of Computer Sciences Corporation

Director of Information Technology

LINTAS Campbell-Ewald, a world-class advertising/r company, is looking to fill this senior management po

The ideal candidate, who will report to the CFO, will be a key member of our management team responsible for overseeing the agency's information systems and technology.

The director will be called upon to develop i today's business problems, including elect transmission, video-compression technolog unications such as vi anage a multi-platforr

Deborah Osbores for of Human Res

LINTAS Campbell-Exekt 30400 Van Dyke, Warren, M. 48003

NETWORK PROFESSIONALS Due to our continued growth and success, Norwest Mortgage has created two po

TECHNICAL SUPPORT MANAGER



C/C++/DOS/OS2/

Results.

world gives retisers results. Weekly. Regional-ly. And Nationally.

To place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

nune/VAX

MIS Director



MAINFRAME

SOFTWARE SALES



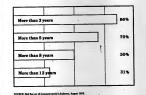
Midwest

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you only qualified computer professionals.

Unlike the readers of Sunday or daily newspapers, every Computerworld reader is an experienced computer profe sional. In fact, the majority of Computerworld's audience has experience beyond three years. What's more, some subscribers have been reading Computerworld ever since its first issue in 1967. Simply put, Computerworld delivers far more than just job candidates - it delivers qualified job candidates.

> Years in Current Job Function Reported by Computerworld's Audience of 629,204



To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA. 508/879-0700).

CA & V/ CONTRACTS

PANTED

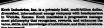
405 RIVERSIDE DR. SUITE SUPEANK, CA 91505 (\$100, \$41-2002 (714) 502-6 FAX: (\$10) 841-2122 Residen MACCO

LE INT. Inc., a worker consisting company. I multiple requirements 1. CRACIE CRACIE CA. 2. DING. NO. C. AC. 3. DING. NO. C. AC. 3. DING. NO. C. AC. 4. DING. NO. C. AC

TANDEM
CORL, FINANTIAL
SCIENCE, GOLLAS
STRATUS
FULCOSOL CORLA
FULCOSOL
FULC

Recruit The Best!

Place your od in regional or national editions of Computerworld's Computer Coreers section. For more information, call Lisa McGrath. 880-343-6474



Kech Industries Information Systems Group offers an extremely challenging, extensive WAN/LAN and multi-vendor mainfram environment with multi-dimensioned, distributed, and diverapplication environments serving many business units in

INFORMATION SYSTEMS SECURITY ADMINISTRATOR

The Information Systems Security Administrator will report the Chief Information Officer. Responsibilities of this upper level position include developing and malrialning information yetens security policies, procedures, and standarité, developing, maintaining, and testing dissater recovery procedures developing and maintaining administrative functions; and editoring ill and its internal outcomes on information systems.

te critical presuccess.
The successful candidate will hold at least a Bachalor's degree in Business or Computer Science and have experience as an information Systems Security Administrator in a similar cavironment. The successful candidate must be a self-motivated.

and critical thinking ability.

Competitive salary and excellent benefits offered. For conside

Keeb Industries, Inc.

KOCH

ectors. Mortgage offers rewarding opportunities in the Mortgage inting industry for top-reted individuals. Quadrupling in size owe is a year paried to the 15th inagest previously of mortgage leans in the flon has created a number of technical apportunities.

Senior Programmer/Analyst (3 positions)

Build new applications in PC WAN environment. Requires B years data processing experience with 3 years in DATAFLEX language, C++, Visua Basic or Jorus NOTES. Excellent technical statis are necessary. The right individual can quickly move to project responsibilities.

Programmer/Analyst (3 positions)
Develop and extend poftware systems in a tightly integrated dev

ment and two years in the DATAFLEX language, C++, or Visual Basic.

e send a confidential Directors Mortgage Loan Corporation resume to: Atta: Production Technology Coordina 1995 Spream Newst Birrende, CA 9207

DIRECTORS.

Programming and Software Engineering Design Opportunities in Rochester, Minnesota Do you have a BS or Higher degree In CS or CE?

IRIAI Rochester has accollent opportunities for programmen and collever opportunities, and the second of the secon

OPERATING SYSTEM/MICROCODE DEVELOPMENT
Responsible for the definition, design and development of the ASMO
Committee System. Stalls or empressed in the following are habited.

Operating system architectum, design and development
 Clienthanner computing model expension
 High level language compiler code generation and optimization
 Database theory, principles, optimization techniques are

Communications architecture, protocols and developme experise

*Systems management and networking expenti *C and UNIX experience

*C++ and OO design and programmin *RISC technology *Pt. based language experience



Prochester: located on gentle solling his short 40 miles west of the Mississipp Riand 75 miles sectionest of Minneapolis in 2t. Part, is most among the best and sail communities in America. Emply although locating, 1200 across of the praise, one of thesel public school episteria in the state or a host of recreational, educational, cultuand interfacement administration.

Don't miss this chance to raise your career expectations while improving your quality of life. Please send your resume and college transcripts in applyment Schrittens Corporation, PO Box 6002, 55905-4002. Fax (807) 250-0746. Please reterence

IBM.

Exciting Software Career Opportunities in San Diego Countyl

Personne Systems, a teacur in the development of enterprise network trainagement Systems, a securities of the section of the sephescard projects for forum 500 and 0000 France 50 dams, from sevel required. Candidates must have an in-depth technical involvings of the URIX and Alf/S operating systems. All production require a 55 degree in companies restored in

Analyst

Use of structured methodologies and rapid application development
 Relational detailess design and a working knowledge of Affilia.

ogrammers - Programming using 4GLs & C/C++
- Development with relational detailes

in the Systems, inc. is an equal opportunity employer with a comfortable, non ing working environment, and excellent barrellot, field your requires oc-

Peregrine

or of Professional Services Server Oaks Way ad, Cattomia \$2000

Looking for new directions? StorageTek is!

ath just got e lot clearer.

Senior Project Manager

nt, at least mer support or market-



GOING WEST??? CASE EXPERIENCE

CYMON AS /SET IFW. EXCELERATOR FULL-TIME of CONSULTING TO \$70K

1 800 959 3088

olds Electrical & Engineering Co., Inc. is the largest prime contractor for the U.S. Depart nt of Energy's Neveda Operations Office (DOE/ NV). Our primary responsibilities focus on op-DOE's Nevada Test Site (NTS).

Work Location: Las Vegas, Nesada

uitions require a bachelor's degr nce, related fields or equivalent ex ence. Must have two years of appli sent experience with Digital Equ Corporation (DEC) VAX/VMS and PC-DOS, using FORTRAN or COBOL, and FoxPro. nent. Should have good cor tion skills, a solid foundation in stre analysis/design, relational database techn egy, and atructured program Knowledge of SmartSter 4GL, NOVELL Netware Operating systems, Lotes 1-2-3, and

EQUAL OPPORTUNITY EMPLOYER - M/F Liberal Fringe Benefits Replies Held Confidentia Must be a U.S. Citisen

WordPerfect is desimble.

Drug's looked acreening test required SEND RESUMES TO: Tradit L. Rainey Recruiting & Employment Administ

Reynolds Electrical & Engineering Co., Past Office Box 98521 Las Vegas, NV 89193 Tel: (702) 295-1900 TDD: (702) 295-2597

FLORIDA IEF/CLIENT SERVER POSITIONS

clude Technical S

Equal Opportunity Employer MF/D/V

SMALLTALK PROFESSIONALS If you are an Experienced Smalltalk Develor
This is Your Opportunity to Join the
MOST EXCITING Team of Object Techno
Professionals in the Country!

Roth Well International, RWI has Challenging Projects Across the US

PO Box 270566, Houston; TX 77277-0566

IMMEDIATE Permanent & Contract OPENINGS!

Over 629,000 computer

professionals read Computerworld weekly.

Marketplace

Give your PC clone a physical exam



whether the quality is up to par. For all you know, the vendor may have queezed a few bucks back into its profit margin with simple system changes that may not be noticeable at first but could contribute to the early demise of the ma-

While most of these problems aren't found on brand-name PCs, small aggressive companies often do whatever it takes to undercut the current market

The safest route is to check out a sample machine. A cursory inspection takes only a few minutes and helps avoid irksome bury, runtime errors and intermittent hardware crashes. Even better, get a written assurance that the systems you order will be equal to or better than the

ple's quality. The diagram to the right is a generic ation of an average PC. Tower cases differ mostly in that they stand up right. More important, if you were to sit on top of a lower case, it shouldn't flex. If the case webbies, what's inside webbles.

too What's had Once you've pulled the cover, check for support bars on both sides that the back wall. If there aren't any, the case

Grab the metal where the drives are mounted and try to bend it. If it flexes like a TV dinner tray, you don't want

the machine. Every time you push in a floppy, you could fiex the drive bays. xamine the cover over the pow supply to see if the vents are too

close to the flat ribbon cables that supply data to the floppy drive. This is disturbingly common in cheap compact desktop cases. You need enough room to push your hand (about three-fourths of an inch) between them without touching the able or power supply case

etal acrews; two along the back row ere the bus slots are and at least one ed with four screws. If the board is

mounted with only nylon standoffs and one screw, it may wiggle when you insert cards or during normal thermal cycli Look at the general arrangem drive and power cables to be sure they've been properly "dressed" into position. If they're haphazardly placed,

that means the system was sloppily con-Take a peek at the type of floppy

drive (or drives) installed. You want a brand-name drive.

If the machine is an 1486, you want two cooling fans. One should sit in-side the power supply, the other some-where inside the case (in the bottomfront of the tower cases, for exa The 486 runs bot and can benefit fr

will have no rolled-over edges. Caner with rolled edges are stron

bus slots correctly and are staupright. Some bargain machines won't allow the eards to stand at a perfect 90

If there are empty drive baye, the in-stalled drives should be space-art to permit more air to flow for bette ng. Also, there should be sufficient

room for expansion.

Look at the front panel of the case.

Are the power and react buttons close to the buttons for ejecting a floopy disk? I've seen cases where they were less than an inch apart. Instead of ejecting a disk, the operator might inad

Household is a free-lance writer and PC commi-tant in Byrbank, Calif.

tently turn the power off.



. 0370

· ES/9000

· AS/400





COMPUTER 800-858-1144 Ext. 97

DEMPSEY. WHERE IBM' QUALITY IS SECOND NATURE

BUY-LEASE-SELL . PS/6000 · Processors · SEPIES/1 Peripherals

 SYSTEM 36/38 Upgrades · INDUSTRIAL PC

(800) 888-2000.

Demosey BUSINESS SYSTEMS

55377 Berson Brist, Suite 333 - Huntington Berson CA 93648 - 17947 B47-B484 - MX: (794) 847-3549

YOUR RISC SYSTEM/6000 SOURCE

DATATREND

CDLA

HARDWARE MIGRATION

937X, 4300, 468X

ENGINEERING SERVICES ENTERPRISE SERVICES

BISC SYSTEM/6000 SERIES/1 (Warm all the leader) **SYSTEM 36/38** AS/400 PS/2, INDUSTRIAL PC

ors, Peripherals, Upgrades, I on, Emulation, Data Transfer. nication Re-Engineering invices, Cable Systems, Senyoes, Refurb/Packing S

BUY . SFLL . LEASE

1-800-FOR-RISC

612-942-9630 10050 Valley, View Rd., Suite 140, Eden Prame, MN 560

0° 88

MAA

708 215-9370 Over 629,000

computer professionals read Computerworld weekly.

CE BO KVA - 8 UNITS ARE: 75 - 125 KVA - 2 UNI M 3: 20-TON DOWNFLOW

FAX 305 425-0681

PRODUCT CLASSIFIED PAGES

Where America's Computer Professionals Shop

(800) 343-6474 (in MA: 508/879-0700)

ANOTHER REASON WHY COMPUTERWORLD **PRODUCT** CLASSIFIED

PAGES WORK

Computerworld's Product Classified Pages pene-trates computer using companies in all key industries. Because Computerworld's total audience blankets key vertical markets that are major users - and major buyers - of computer products and services.

Computerworld's Total Audience

Manufacturing (excluding computers)	78,021
General Incurrence Peol Fornie	71,729
Education, Medical, Legal	
Business Services (excluding ISI	45,932
Government	62,291
Utilities, Communications Systems,	
Transportation Services	58,516
Mining Construction, Petroleum & Refining	
Monifernment of Computers & Peripherals	63,550
Continue Interpretors VAPs Character Service	
	. 100,673
Other	28,313
Total	

Ta place your ad, call John Carrigon, Vice President/Classified Advertising, at

800/343-6474 (in MA, 508/879-0700)



FISA IS LOOKING TO DO BUSINESS WITH YOUR COMPANY The New York City Financial Information Services Agency wants to add to its vendor lists for DP goods and

Write FISA at 111 8th Ave. NYC 10011: attr Ms. Millie Nieves Product Classified

Pages (800) 343-6474

week

COMPUTERWORLD

Product Classified Pages

need only 2 days notice

to run your ad!

When you're selling, you want your odver-tising to hit the market quickly and frequently. You con't offord to woit for on issue

that's coming out several weeks -- or months

there's no woiting for the next ovoilable is-sue because we've got one for you every

What's more, your od con oppeor in the Mondov issue of Computerworld if you order just 2 doys prior to the issue. Advertise in the newspaper that won't keep you woiting. Advertise in Computerworld's Product Classified Pages!

> For more information, call:

800/343-6474

(in MA, 508/879-0700)

-- into the future. With Computerworld,

broker COMPUTER TIME and VICES on ALL platforms.

te 1968 we have found your VEST prices from over 2000 onwide data centers. Call Don Seiden at:

COMPUTER RESERVES,INC 800 882-0988 (201) 882-9700



CI C INFORMATION

SALJENT CORPORATION

Or the Std Down Blad

It's the

CALL NOW!

800) 343-6474 PUTERWORLD



TOTAL SOLUTION for your busine ts. Call today and consid-

... A Wilcome Alte RTIN MARIETTA COMPLITING REP 1-800-572-7887

Every vendor on this page has a well-equipped data center

We all have large systems plenty of MI UPS systems with the software you in ONLY ONE WILL EXCE

YOUR EXPECTATIO YOU'RE IN CONTROL

WHEN YOU PUT US IN CONTROL

ALICOMP. INC. The "Boutique" of the Computer Services Woo

VM. MVS. VSE

cing/Ilmesharing/C Two State of the Art Locati

Our Platform is Excellence Serving Clients Since 1900 (212) 886-3600 • (800) 274-5556

COMPLITERWORLD PRODUCT CLASSIFIED Application Development

Cross Platform Execution

pre 22

YNON

ncepte & Applicati SMALLTALK & C++ CONT "Get Lipst in the Hierarchy DG Participate in an Intensive 5-Day Introductory Course by RWI

Roth Well International, RWI 00) 256-0541 or (713) 660-8060

SOLUTIONS DIRECTORY!

800 343-6474 ext. 744

terworld, you can make to the library without

desk.

let costs just \$25.00 and includes everything you OW Online including easy-to-use communications. you'll be integrated just \$45.00 (how (up to 2400 bps 200 bps and up) for access time along with a \$5.00 inclos ties, thu can even set your account up for us to or involce your company on a monthly basis.

Call today for your CW Online start-up kit including

A library of COMPUTERWOOLD articles n or to order call 800-643-4668 today.

Do your users know which button to push?

Free Catalog 800 937-1337 Fax: 602-634-4620



 Supports data speeds up to 115.2K based on all channels
 ISA, EISA, MCA - RISC-based - Software selectable EU232/EIA-422 — an industry first - 16- or 32-bit comment
fions on 8 or 16 ports - Exclusive SereGeard ** protection STUR LOATE

1-800-782-7428 nion. CH 216-349-1860 FAX 216-349-2056



COMPUTERWORLD's
"5th Wave" Curtoon Mouse Puil

MPLITERWORLD



► Call for the best pricing on any modern

► Access your LAN from home larrywherel ► Laptop, Notebook, or Desktop ► Single or Multi User Solutions ➤ Speeds up to 57,600 bps
➤ Includes Network Security

COMPUTER PRODUCTS, N.A. Specializing in Asym: & Sym: Dial-Up 201-335-6335

LAN / WAN **Dial-up Solutions**

Token Ring or Ethernet

200/343-6474

Solutions Directory

 Consultants ◆ Value Added Resellers ◆ Marketing Partners ◆ OEMs ◆ Systems Integrators ◆ Distributors To list your company so that Computerworld's readers can contact you directly, dial 800/343-6474, x744. Basic company listings will appear 26 consecutive weeks for just \$499.

	SPECTRUM ASSOCIATES Wodum, MA (617) 932-0932	٢
Computative Associates River Edge, NJ(800) 847-6563		1
OMNitech Consulting Services, Inc. Edeon, NJ	The service of the se	ı
	Lexington, MA (617) 963-8400 Zetech Inc.	ē
ACCTG SOFTWARE/SERVICES		Ā
Arthur Blingsen & Co. Arington Heights, E	COMMUNICATIONS	Ē
Beacon Application Services Corp S. Natick, MA		M
Management Information Consulting, Inc. Falls Church, VA(703) 845-5600		
Falls Church, VA(703) 845-5800		N
Myers-Holum, Inc. New York, NY (2)2) 753-5353.	Informix/Oracie/Ingres/Sybses/Unix Atlanta, GA (800) 264-6666	O
OPEN SYSTEMS® Accounting Software Open Systems Holdings Corp. (800) 328-2276	ADANAT, INC	
Phase 2 Consulting, Inc.	Tacoma, WA (206) 927-1219 Allence Consulting Group, Inc.	E
Cumberland, Rt(401) 333-4536	McLean, VA(703) 243-8979	ě
ADABAS	T.J. Bredy & Associates Sommerville, NJ (908) 359-0236	E
ADA/NAT, Inc. Tecome, WA (206) 927-1219	Jerry Cohen & Associates Portland, OR(\$03) 289-7706	200
APPLICATIONS DEVELOPMENT		E
Avalon Engineer hc. Boston, MA (617) 247-7655	Decision Software Systems Willow Grove, PA	F
James Borta & Associates Hoffman Estates, L (708) 852-1301		
		E
		8
CompuSoive Associates River Edge, NJ (800) 847-6583	TechniSource, Inc. P. Lauderdale, R (305) 493-8901	C
ISA Consultants Chicago, L (800) 462-6301		ï
MCS Applied Concepts, Inc.	The Help Desk Inc.	ě
New York, NY (212) 732-7452 Origin Technology in Business	Phoenix, AZ(602) 460-1926	S
	SPECTRUM ASSOCIATES (617) 932-0832	6
Planet Data/Paradox Windows Programming Moriches, New York (\$16) 878-8800	DATA CONVERSION	A
		200
Atlanta, GA		Ĉ
AUTOMATION AND CONTROL	DATA CTR DESIGN/MGMT	6
Concept XXI, Inc. Cleveland, OH (216) 831-2121	21st Century Innovations, Inc. Also Viejo, CA (600) 327-4627	14
BANKING/FINANCIAL	DBMS	
Ongin Technology in Business Columbus, OH (614) 431-2345	Advanced Data Management (800) 962-6577 Document DATABASE Tool for the Professionals We	K
	Advanced Data Managament (200) 962-5277 Document DATASASE Tool for the Professionals War have SVM and Cell groupines available Call-Write 15 Man 25 Angelon (sci 2003)	E
BAR CODE/DATA COLLECT SYS Sentinel Business Systems, Inc.		
Millord, CT (203) 874-3190	Business Application Developers, Inc.	5
Millord, CT (203) 874-3199	Business Application Developers, Inc. Anchorage, AK (907) 562-5646 CompulSolve Associates	Sm.
Millord, CT (203) 874-3199	Compution Associates River Edge, NJ (900) 847-6563	SE
C Decision Software Systems Wildow Grove, PA (800) 882-079-	Business Application Developers, Inc. Anchorage, AX. Computitive Associatios River Edge, NJ. (800) 847-6863 On-Line Systems Group St. Petersburg, FL. (800) 322-5265	SE
Milliond, CT (200) 874-3191 C Decision Software Systems Wistow Grove, PA (800) 882-079- CABLING SERVICES	St. Petersburg, FL(800) 322-5265	
Milliond, CT (200) 874-3191 C Decision Software Systems Wistow Grove, PA (800) 882-079- CABLING SERVICES	St. Petersburg, FL(800) 322-5365 DISASTER RECOVERY	
Mitterd, CT	St. Petenburg, Ft (800) 322-5265 DISASTER RECOVERY Computer/Security Consultants, Inc., Rode-fed, CT	
Matterd, CT	On-Line Systems Group S. Peerroburg FL. (800) 322-5265 DISASTER RECOVERY Computer Security Consultants. Inc. Ridgefeld CT (800) 925-2724 Advanced Information Hamagement (703/643-2722 Woodshrige, VA FAX (703/643-2722	
Mitterd, CT	On-Line Systems Group S. Peerroburg FL. (800) 322-5265 DISASTER RECOVERY Computer Security Consultants. Inc. Ridgefeld CT (800) 925-2724 Advanced Information Hamagement (703/643-2722 Woodshrige, VA FAX (703/643-2722	
Matterd, CT	Ch. Line Systems Group St. Peterforup, Ft. (800) 322-5555 DISASTER RECOVERY Computer Security Consultants, Inc. Reciperiod, CT (800) 925-9724 Advanced Information Management (780)FG 1002 Woodchopy, VFAX (700) 643-972-98 Raymond Professional Management, Inc. Roswell, GA (64) 947-7490	
Metor, CT (200) 874-3196 C C C C C C C C C C C C C C C C C C C	Ch. Lee Systems (Goup. 2. Peterbroup; 61.0.) 2. Peterbroup; 61.0.) 2. Peterbroup; 61.0. 2. Pe	
Merci, CT	On-Live Systems Gouge 2. Peterstrong FL	
Monot, CT. (200) 874-978 C Docioso Scheme Systems (800) 885-079- CABLING SERVICES ANDROVING, 805-100 Service Locations Personnels, 205-100 Service Locations Personnels, 205-100 Service Locations Personnels, 205-100 Service Locations Personnels College (205) 100-100 Service CASE Lenguine Scheme Spacosiens (700) 940-5079 CULENT SERVER DEVELOPERS COLTE, (Procedibles VIII) Pleas Tool, NY ANDROVERS (207) 945-9509 AND	Chiral Systems Group 2. Pearson Systems (Soc) DISASTER RECOVERY Corns beriflearing Consularia Inc. (1995-1974) Regiend CT (1995-1974) Regiend CT (1995-1974) Regiend CT (1995-1974) Regiend Professional Binarysment, Inc. Regiend Regiend Light Schware (1995) Regiend Regiend Regiend R	
Mercut CT	Christystems Good (KO) 222-5695 DISASTER RECOVERY PROPERTY (Committee (KO) 92-57-58 Advanced Information Integrated (TSI) 65-927-8 Advanced Information Integrated (TSI) 65-927-8 Advanced Information Integrated (TSI) 65-927-8 Revenue (Ko) 64-92-92-92-92-92-92-92-92-92-92-92-92-92-	
Mercut CT	Christystems Good (SC) 222-2695 DISASTER RECOVERY Corro-barried Courte Corroll (SC) 922-2695 DISASTER (SC) PROCESSER Corro-barried Courte Corroll (SC) 922-2695 Corro-barried Courte Corroll (SC) 922-272-272 Corro-barried Courte Corro-barried Courte Courte Courte (SC) 922-272-972 Corro-barried Courte Courte Courte (SC) 922-972-972 Corro-barried Courte (SC) 922-972-97	
Mercut CT	Christystems Good (SC) 222-2695 DISASTER RECOVERY Corro-barried Courte Corroll (SC) 922-2695 DISASTER (SC) PROCESSER Corro-barried Courte Corroll (SC) 922-2695 Corro-barried Courte Corroll (SC) 922-272-272 Corro-barried Courte Corro-barried Courte Courte Courte (SC) 922-272-972 Corro-barried Courte Courte Courte (SC) 922-972-972 Corro-barried Courte (SC) 922-972-97	
Mercut CT	Chair Signature (Since) DISASTER RECOVERY Companishers (Since) Groundarin, Inc. (Since) Groundar	

SPECTRUM ASSOCIATES Wodum, MA (617) 932-0932	IS Training Services (508) 635-6
The I Stimate Commission	ng services and training scatters designed to me
Harrover, NJ (201) 887-1000 WATERFIELD: PowerBuilder Seine & Connelling Lexington, MA (617) 963-9400	rig services and training southern designed to se the entire S function including the clients of S many information contact Boylan & Association 5 Mandetin Lt. Actor, MA 01720 Cell new?
Lexington, MA (617) 963-8400 Zelech, Inc.	Skill Dynamics, An 1991 Company
Starriford, CT (203) 359-9807	Skill Dynamics, An ISM Company A full service training company that spec in technical and business training, com-
COMMUNICATIONS	outpourcing and business training, consultanting and customized afferings. Ca ISM-TEACH for a free catalog.
Decision Software Systems Willow Grove, PA (800) 682-0794	MS Training Institute (508) 875 FAX (508) 675
CONTRACT PROGRAMMING	Maternal Education Training Group, Inc.
Mornis/Oracia/Invest/Subseal Inv	Napervite, IL (708) 360
Atlanta, GA (800) 264-6006	Object Oriented Preparation Services, Inc. Robbinsville, NJ (609) 256
ADA/NAT, INC Tecome, WA (206) 927-1219	ELECTRONIC DATA INTERCHA
Alience Consulting Group, Inc. McLean, VA (703) 243-8979	DNS Associates, Inc. Burlington, MA
T.J. Brady & Associates Sommerstin, NJ	FD Arie Inc
	Malvem, PA . (215) 9K
Porfund, OR	Integrated Software Specialists Scheumburg, IL (705) 240
Comsys Technical Services, Inc. Rockville, MD (301) 921-3600	ENTERPRISE RESOURCE P
Roctiville, MD (201) 921-3600 Decision Software Systems Wildow Grove, PA (800) 683-0794 DGS Plantomers	FOURTH SHIFT CORPORATION (JIT) Moneapole, MN
DGS Electronics Albany, NY (\$16) 869-1305	EXPERT SYSTEMS
	FOUNDATION TECHNOLOGIES, INC.
Roslyn Harghts, NY	FOUNDATION TECHNOLOGIES, INC. Boston, MA(617) 72
TechniSource, Inc. Pt. Lauderdale, Pt (305) 493-8901	OtoKO Corporation Anapolis, MD (410) 26
CUSTOMER SERVICE	FOCUS
The Help Desk, Inc. Phoenix, AZ	FOCAL SYSTEMS, INC.: Focus Consultor Seattle, WA (205) 78
SPECTRUM ASSOCIATES	
	GOV'T/MUNICIPALITIES Artur Bingsen & Co. Arington Heights, L
DATA CONVERSION	Arington Heights, E
Data Conversion, Inc. Minnespole, MN	DC, Inc. Chicago, L(312) 46
DATA CTR DESIGN/MGMT	GROUP WARE/E-MAIL
21st Century Innovations, Inc. Also Viejo, CA (800) 327-4627	LACE for it now binder VARIO
	New York, NY
DBMS	GUI FRONT ENDS
Advanced Data Management (900) 903-4377 Dourser DATASAS: Tas for the Revisions We have 1981 and Dat propers available California IS Man IS Region No. 2003	WATERFIELD: Powerthalder Sales & Con Lexington, MA(617) 96:
New NWI and Old programs avalable Californic 15 Man 12 Kingston NJ 20025	HEALTH CARE
	Systems Resources Com-
Business Application Developers, Inc. Anchorage, AK (907) 562-5646 Compulsolve Associates River Edge, NJ (800) 847-6863	
River Edge, NJ (800) 847-6563	HELP DESK
On-Line Systems Group St. Petersburg, FL(800) 322-5265	The Help Desk, Inc. Phoenix, AZ
DISASTER RECOVERY	HUMAN RESOURCE SOFTWA
Computer Security Consultants, Inc. Ridoefeld, CT	SPECTRUM Human Resource Systems Corpo Denver, CO. (800) 33
Ridgefield, CT	
Woodbridge, VA FAX	HUMAN RESOURCE SYSTEM
Raymond Professional Management, Inc. Reswell, GA	PC/LAN Personnel, Benefit, and HR Syst STS, Inc. Rolling Meadows, L (800) 22
Recovery Management, Inc. REXSYSE Software (800) RMI-8886	INSURANCE
Stroki Systems	Programming Resources Company Harriard, CT (203) 72
Strohl Systems LDRPS Software (800) 634-2016	IMAGING
EDUCATION & TRAINING	
Carl A. Argilla, Ph D., Inc. Los Angeles, CA(800) 347-6903	Avaion Engineering, Inc. Boston, MA
	Burns Consulting Group' Scituate, MA (617) 98
Specializing in street covering travely and	Grumman InfoConversion Hollsville, NY (516) 73
Engreening Inc., 121 Laborator Styl., Sto. 202 Gast- enfoat, MD 20077	Imaging Expo. NY Sept 28-30
	Sept 25-30 800 44

	United Systems and Software, Inc.
Speciality is providing to-demand educational consult	Mailand, R (407) 875-2120
IS Training Services (509) 635-6619 Security in providing terroller discussions cerebring services and tearing seasons conquest to support the enter Si fundor—including the clarity of Si for mon-information contact Boylan 4 Associates 5 On Macdon Lin. Actor, 144 (1725) Cal next	MANUFACTURING
Meadow Lit. Actor, NA 01720 Cell now!	SPECTRUM ASSOCIATES Workern, MA
Skill Dynamics, An IIIM Company	
Skill Dynamics, An ISSI Company A full cervice training company flot specializes in solvincial and business training, consulting, outstanding and customized offsetings. Call 1950: ISSI-TEACH for a five costing.	MANUFACTURING SOFTWARE
outpourcing and customized offerings. Call 1900 899-TEACH for a free catalog.	
MS Training Institute (508) 879-7999	Burington MA (517) 273-2920
National Education Training Group, Inc.	North Coast Automation, Inc.
Napervilla, IL (708) 389-3000	
Object Orented Preparation Services, Inc. Robbinsville, NJ 8609; 259-0601	Open Systems Holdings Corp. (600) 328-2278
ELECTRONIC DATA INTERCHANGE	NETWORKING
DNS Associates, Inc.	Aret Eugene, OR
Burlington, MA (800) 824-6354 EDI Abie. Inc	OUTSOURCING
Maham, PA . (215) 993-0813	
Integrated Software Specialists Schlumburg, IL	Advanced Date Management (200) 224-2772 A full service system integrator. Design Strongs im- plementation, all major detailment and tests. Call Write 18 Major St. Kingston, Ist. 36508.
ENTERPRISE RESOURCE PLNG	
FOLIRTH SHIFT CORPORATION (ATT)	PAYROLL SYSTEMS SPECTRUM Human Resource Systems Corporation
Mnnespots, MN(800) 433-2467	Denver CO (800) 334 5660
FOUNDATION TECHNOLOGIES, INC.	PC/LAN Payrol, HR, and Tax Systems STS, Inc. Rolling Meadows, IL (800) 227-2729
Boston, MA(617) 720-2760	PRODUCTIVITY
OXXX Corporation Anapole, MD . (410) 266-1671	Korth Productivity Consultana
FOCUS	Bel Ar. MD
FOCAL SYSTEMS INC. Focus Consulton	East Amherst, NY (716) 689-7724
FOCAL SYSTEMS, INC.: Focus Consulting Seatle, WA (206) 786-4467	SALES FORCE AUTOMATION
GOV'T/MUNICIPALITIES	Gateway Systems Corporation East Lansing, MI
Arthur Ellingson & Co. Arlington Heights, B (708) 506-0555	SCHEDULING/PLANNING
DC Im	Summer Solutions, Inc.
Onicago, IL (312) 464-1020	Chesterton, N (219) 929-4169
GROUP WARE/E-MAIL	SECURITY
New York, NY	Phase 2 Consulting, Inc. Cumberland, Rt
GUI FRONT ENDS	RSH Consulting, Inc Newton, MA (617) 969-9050
WATERFIELD: Powerbuilder Sales & Consulting Lexington, MA(617) 863-8400	
	PACE/Systems (914) 425-7756 Z Lock Mo. Co.
HEALTH CARE	Redondo Besch, CA . (210) 372-4642
Systems Resources Corp. Burington, MA (617) 270-9228	SOFTWARE FOR SCHOOLS
HELP DESK	Matrix Computer Systems, Inc. Mayauties, Wi (414) 541-3028
The Help Desk, Inc. Phoenix, AZ (602) 460-1926	SPEECH INTEGRATION
	Zedech Ivo
HUMAN RESOURCE SOFTWARE SPECIFICAL PLANTS PROGRESS SHEETS CONSTRUCT	Stamford, CT . (203) 359-9907
Denver. CO. (800) 334-5680	STORAGE MGMT SOFTWARE SVCS
HUMAN RESOURCE SYSTEMS	Riverside CA (909) 666-7012
PCA AN Personnel Repetit, and HR Systems	(301) 000 7012

TRANSPORTATION SOFTWARE UTILITIES

a demosted resource to help you find the information you need quickly - Computerworld on CD.

With this valuable resource tool you can:

- · Find product and vendor company information quickly.
- · Stay on top of strategic industry directions.
- · Follow critical technology trend · Analyze top company IS profiles and compare with yours.
- · Execute key word searches oo any topic within seconds.
- · Eliminate mass paper storage.

Your subscription to Computerworld on CD includes:

- · Over four years worth of full text articles from Computerworld.
- · Selected graphics from each issue showing industry trends, product comparisons and more

· Articles from Computerworld's annual Premier 100 and Computer · Detailed information from the

- Premier 100 database total score, profit growth, IS budget, company highlights and more.
- · Plus a new bonus feature over five years worth of articles from the Journal of Information Systems
- Education, published by DPMA

Save \$100 on charter subscription offer.

Become a charter subscriber for just \$295 and save \$100 off the regular annual price of \$395. This offer is available for a limited time only, so act oow.

Your annual subscription includes four discs updated quarterly.

A special Sony Multimedia Player bundle offer:

The ultimate in portability! Access Computerworld oo CD anywhere, anytime with Sony's Multimedia CD-ROM Player (featuring CD music playback capability). Specially packaged price is just \$1195.

ow with multi-platform apability.

Computerworld on CD operates oo a PC (DOS and OS/2) Mac, and in a Windows environment. Computerworld oo CD also runs oo the Sony Multimedia CD: ROM

What users like about Computerworld on CD:

"It can look up products and company names...

"... finds product information and client information quickly."

"...full base text, good graphical start for each

"Can search across multiple issues and find the thing I'm looking for. Makes life easier."

"The sheer volume of what's in it. Easy access without having to go to a library service."

"It has information not found

on Computer Select."

or, more information or to order call

ide of the U.S. call: (508) 879-0006

COMPUTERWORLD The Newspeper of 15

> IDG

till trademarks are property of their respective cursers.

Companies in this issue

Page number refers to page on which story begins

3Con Coep	Detabase Solutions
SM Co	Data Geocrat/Corp. 64 Database Associates 61 Database Associates 4.52,61 Database Associates 62,61 Dausphin Technology, Inc. 68 David Sarnoff Research Center 28
A	Determent for
Abscus Distribution Systems Pte Ltd 81	Doughts Technology Inc. 49
Aberdoes Group 91 ACT Group 189 AddStot Inc. 15 ADP, Inc. 73	David Sarnoll Research Center 28
ACT Group	Dell Computer Corp 6,112
AddStor Inc. 15	David Sarnoll Research Center 27 Delt Computer Corp. 6, 122 Deltsarva Power & Light Co. 1 Delts Airlines. 5 Delts Airlines. 6 Daving Systems Inc. 6 Daving Systems 125
ADP Inc. 73 Advanced Visual Systems, Inc. 169 Agwag Inc. 150 Ann Soliware Corp. 40 Ann Soliware Corp. 50 Antennative Technologies 51 Annotals Corp. 160 Annotals Management Systems, Inc. 167	Delta Airlines
	Dharma Systems, Inc
Agway Inc. 150	District Production Com. 04 01 04 00 04 170
Agreeg Bit. 100 Alm Sidwarer Cury	Digital Instrumentation Technology Inc. 50
American 189	Dr Proper/The Seven-Un Co
American Management Systems, Inc. 107	
American Public Radio	
American Steamship Co	Eastman Kodak Co
AMRC P 81,170	Electronic Data Systems Corp 168.170
Anderson Consulting 105	Elf Alsochem North America, Inc16
A. O. Smith Automotive Products Co1	Elms information between Group
AP Kesparch	Parameter Industries
Apex (Max, Inc.	Franciscom 94
71.73.116.112	EO. Inc. 20,66
Applices, Ite	Ericeson GE Mobile Communications, Inc. 4
Applied Engineering, Inc	Erest & Young
APS Technologies, Inc	E-Systems, Inc.
Applice Inc. 60 Applied Engineering, Inc. 54 APS Technologies, Inc. 56 APS Technologies, Inc. 56 ASK Group, Inc. 61,6,48,61,112,141 ATB Associates 61,64 ATAT C. (50,28,40,76,81,86	E-Systems, Inc. 6 Extrasensory Seftware 94
AST Research, Inc	
ATB Associates 85	Control Control Control Control
AT&T 1020,28,49,79,81,96	Class Bank Systems Group, Go
ATAT Bell Laboratories, Inc. 93 Auspex, Inc. 6 Avon Products, Inc. 97	Flest Boston Corn
Avan Products. Inc. 97	First Data Corp. 100
Banyus Systems, Inc. 61	Ford Motor Co 71
В	Forrester Research, Inc
Banyua Systems, Inc	Frame Technology Corp
Basseh & Lorab 116 Bacter Healthcure Corp. 6 BU Hydro. 1	Extraorancy Suftware: 98 Filmitines Systems Group, Inn. 98 First Bask Systems — 100 First Bask Systems — 100 First Bask Systems — 100 First Data Corp. — 100 First Data Corp. — 100 First Bask Systems — 100 First Data Corp. — 140 First Data Corp. — 141 Future Labs. 18c. — 141
Hacter Beatthcare Corp	P Sture Cass, Inc.
BC Hydro	Gartner Group, Inc. 8,24,84,181 General Instruments Corp. 3 General Marie, Inc. 7
Beverage Distributors, Inc. 116 Bochringer Mannheim Corp. 56 Boeing Co. 71 Borinad International, Inc. 6,14,15,49,155	Gartner-Green Inc
Boolest Co. 71	General Instruments Corp
Borinad International, Inc 6,14,15,49,155	General Magic, Inc
Bortish Columbia Systems Corp. 120 BT 170 BT North America, Inc. 77 Budget Rend A Car Corp. 170	General Instruments Corp. General Morge, Inc. 7 General Moson Corp. 7 General Moson Corp. 7 General Moson Corp. 9 General Moson Corp. 9 General Moson Corp. 9 General General Moson Corp. 9 General Moson Corp. 6 General Moson Corp. 7 General Moson Corp. 6 General Mo
BT 170	Generic Software, Inc
BY North America, Inc	Go Corp.
Budget Rend A Car Corp	Cod Shotema Inc
Cabber Collision Centers 73 Causile Corp. 169	Gradiere Turboologies Inc. 171
Calibra Collision Canters 73	Grid Systems Corn. 4.4
Carelle Com 169	Groupe Bull
Cargill, Inc	Hartey-Davidson, Inc
Caterpilise lac	Harley-Davidson, Inc.
CeBularVision	Hewlett-Packard Co 1,14, 16,32,91,91
Continue College and Comp. 13	Hitton Hotels Corp. 17
CCI Informations 169	Hitachi Competer Products, Inc.
Chaleton Consulting Inc 62	Helt Co.
Cuipili, Ibe. 12 Categolia Ibe. 17 Cabular Vision. 18 Cabular Comp. 17 Coll Informatique. 18 Calaries Consulting Ibe. 62 Calaries Collegia Ibe. 18 Cabularies Consulting Ibe. 62 Calaries Collegia Ibe. 18 Cabularies Consulting Ibe. 62 Calaries Consulting Ibe. 63 Cabularies Consulting Ibe. 63 Cabularies Collegia Ibe. 64	Histohi Computer Products, Inc. Bott Co. Bydro Amerika, Inc. 4 Hyperdesk Corp. 5 IBM
Chemical Banking Corp 105	Hyperdesk Corp
Chesebrough-Ponds USA	
Chevron Corp	1004 1 46 19 14 15 16
Circon Systems, Inc	IBM
Comes les	IMRS Inc
Compant Corp.	MRS, Inc. Industrial Light & Magler Local/Bin Ltd. Industrial Corp. Industrial Light & Magler Local/Bin Ltd. Industrial Corp.
Communication Intelligence Corn	LucasFilm Ud6
Compaq Computer Corp 6,48,112,141	Inforite Corp
Compression Labs, Inc	Internation Systems
Cince Systems, Inc. 172.1, 189 Cogton, Inc. 100 Cogton, Inc. 100 Communication Intelligence Corp. 6 Communication Intelligence Corp. 6 Company Computer Corp. 6 Computer Science Corp. 100 Computer Science Corp. 100 Computer	Marketing, inc. 97,107.19 Information Dimensions, Inc. 97,107.19 Informit Software, Inc. 28,61,64,15
CompuABd Computer Corp. 6	Information Dimensions, Inc. 19
Compu-benga Group, IEC	Insperior Inc
Competer Associator	Insession, Inc
International Inc. 16 169	Intel Corp
Computer Sciences Corp16,170	InterCorp. 14.6 Intermitenal Data Corp. Intermitenal Data Corp. 7 Intercop Co. 7 InterSystems, Inc. 9
Computer Corp. 68 Connecticut Mutual Life Insurance Co. 149 Cowen & Co. 168,170	Interop Co
Connecticut Mutual Life Insurance Co 149	InterSystems, Inc. 9
Cowen & Co 168,170	leoser
CSC Index, Inc. 61	1000
CSC Index, lac. 51 Cyrix Corp. 14	
CSC index, lae. 61 Cyrix Corp. 14	Jaguar Software 16
CSC Index, lac. 51 Cyrix Corp. 14	Jaguar Software 16

ı	8.
	Labor Permanente
۱	inleids
	mart Corn 71
	inowiedgeWare, Inc
	awrence Livermore National Laboratory 1
	ending Edge Products, Inc
	egent Corp
	perhand Missiles & Space Co
	otus Development Corp 1,14,15,49,62, 76,116,117
	ució, Inc
	//
	Hadge Networks, Inc
į	Hadge Networks, Inc. 77 Haggas Computer Corp. 169 Haxtor Corp. 170 (B Solutions, Inc. 88
1	
į	McCaw Cellular Communications
į	MCI 70 Morrill Lynch & Co. 16,170 Morris Pinancial Inc. 16
į	Meta Group, Inc. 1,91,155 Metropolitan Financial Corp. 101
į	Microelectronics and Computer
	Technology Corp. 7: MicrosoftCorp 1,6,15,28,49,58
	Micro(Touch Systems, Inc. 54
	Hougemery Securities
	Misshell International, Inc. 77 Montgomery Securities 10 Montgomery Securities 10 Montgomery Securities 10 Montgom Stanley Group, Inc. 10
	N N
	National Diagnostic Systems150
	NationsRank
	NEC Technologies, Inc
	Networth Inc
	NMI Inc
	Notable Technologies, Inc. 4 Novell, Inc. 1,4,8,12,14,61,64,77.16
	Novell, Inc. 1,4,8,12,14,61,64,77.16 Nynex Corp. 16
	0
	Object Design 8 Otan Mills, Inc. 8 Ontario Hydro
	Ontario Hydro
	Open Software Foundation
	OSIware, Inc
	Ovum Ltd
	P
	PacifiCare Health Systems, Inc
	Packard Bell Electronics, Inc
	Pansophic, Inc. 10
	Paramax Systems Corp. 15 Performance Computing, Inc.
	Perot Systems Corp9
	Picerer Software, Inc
	ProActive Software, Inc
	Prodigy Services Co
	Proteon Inc. 71.16

gi	ns
1	Quarterdeck Office Systems, Inc
85	R
65 16 64 71	Recel-Datacom, Inc
71	Recei-Datacom, Inc
170	Rockwell International Corp 52
	5
y 1 16 163 170	Salemon Brothers, Inc. 16,97 Sagiem International Corp. 91
163	Seamuse Technology, Inc
62,	Shaw, Pittman, Potts & Trowbridge 16
. 93 . 77 169	Shins Corp. 116 Silicon Graphics, Inc. 52,64 Sin Ware, Inc. 4 Software AG of North America, Inc. 91
	Sin Ware, Inc. 4 Software AG of North America, Inc
. 77	Software Transformation, Inc. 16 Softwarebouse Corp. 94
189	Softwarebouse Corp
.88	Sprial Corp
170 .88 110 .20 .76	Storage Technology Corp. 6 Stratos Computer, Inc. 55 Sun Daia, Inc. 100 Sun Disk Corp. 170
. 76	Sun Date, Inc
170	
155	SunGard Data Systems, Inc. 100
103	
. 71 158.	Symantee Corp. 32 Some Research Inc. 12
170	Synctori Inc. 86
. 58	
170 58 73 168	
108 4,54 . 16	Tellment Corp. 1 90
	Tandem Computers, Inc. 12.85 Telebit Corp. 188 TeleChoice, Inc. 20
155 . 16 1,53	Tele-Choice, Inc. 20 Tele-Communications, Igc. 49
. 16	
. 61	The BES Group Ltd 160
. 61 . 24 9,64	Texas Instruments, Inc. 109 The BIS Group Ltd. 109 The CTT Group 105 The Technology Group 54 The Trechnology Group 54
. 97	
	The Vicopolat Group1 Thomson Consumer Electronics28
_61	Time Warner, Inc
49 .169 .169	Traces World Airlines
169	Traveling Setware, Inc
-93 -86	Ų
_93 86	Uniface Corp
	United Parent Service, Inc. 6
169	
.155	V
116	Varitee Corp.
_97	VMark Software, Inc
64	Wall Deta, Inc
- 9t 169	Weitfeet Communications, Inc. 12, 148 WordPerfect Corp. 14, 49
155	Worldspan Travel information Services 81
6	Worldtalk Corp. 76,160
_ 14	X
4 56	Xceinet, Inc. 116 XDB Systems, Inc. 94
_ 28 _ 38	Xerox Corp. 6,28,40 Xerox Imaging Systems, Inc. 40
.168	Xi-rox Imaging Systems, Inc. 49 Xi-rom, Inc. 34
- 14	Xirrom, luc. 14 X/Open Co. 8



Breaking in

ent — routers, bridges and smart nierzetworking equipment — roeters, pringes and susset ubs — in the latest industry sector to prove the old adage. There's no such thing as a free lunch."

There is no such thing as a five hunch."

Ampings into the bounding market is no quarantee of success on Wild Street. While share prices have skyrocheted for market leaders used in Class Systems, Inc. (1972), whethere Communications, Inc. (1971) and Syroptics Communications, Inc. (1972), and Syroptics Communications, Inc. (1972), and Syroptics of Communications, Inc. (1972), and Syroptics of Communications, Inc. (1972), and Syroptics of Lorent Lorentz of Lor

sarily a 'rising tide lifting all boats' nituation," said Eric ick, a senior analyst at Donaldson, Lufkin & Jeurette Se-

The following companies have tried to diversity into the nternetworking market, with varying degrees of success: Proteon, inc. (PTON). Proteon's stock started the year at approximately 10 and is currently trading around 5. Analysis said Proteon, which has relied primarily on third-party distributors to move its routers, illustrates the difficulties faced by companies that move into inseructworking from

The issue with a router sale is that it's not a box sale; it's

The near with a restore sake is that it's not a box only it's and possing profession and more of an inference as admirance low of 3, moved into internetworking with its NetBlazer dial-up router products. The company still saffers from a high up roster products. The company still safters from a high degree of emposure to the enormously competitive, lower margin modern business, according to James Kodersha, an analysi at Cowne & Co. Kodersha sadile does not recom-mend purchasing Telebit stock, but the company has made several moves recently that may strengthen its market po-sition.— Persk Stater

_	-) Par	O-	CHANGE				
		-	SUAL PRODUCTIONS		0.0		910	1143	5 88 5 50	100
					4.00	17.7	mi			
210	M0.00	963	SCENECODE TECNECODO DO	78.43 79.45		41	OTC	54.75		
ers.	91 00	62.75	AFERCAS INFO HOS COM UN							
175		40.63	MATEL COMMUNICATION CORP (90)				010			
	4.06 34.30	93.25	Binario System Inc						16	
275	37.50	99.35	Spin Strawery Cour. 36				gtc		1.86	M
603	57.30	44.75	Emusore Coor				arc	12.00	4.25	-
m							gitt	44.00	27.25	
210			Secontrapy: Tetraphysis				910	17.23	4.50	
				104 7	3.25	3.2	600	29.00 44.00	95 50	6
			CONTRANS COMMUNICATIONS	22 00	2.00	16.0	075	34.25	15.30	
pec.				45 25		12	200	200	22.50	i i
	54.25	22.13	Crace Systems inc	12.50	4.13	10		732		
200	16.39	5.50	COMPRESSION LARS INC.				210		22/00	
bΝ	96.00	11.25	Canadamie Sura Service Comm							
500	10.68	12.95	Opports Comm. Assec.							Ю
Ners OTC	12.73	12.00	Desired Systems (NY) (Inc.					41.90		9
310	92.50	4.90	CSC COMMUNICATIONS FO						3.50	
				6.9			210	24.25	11.75	I.S
310							GTC	12.25	147	5
				2.6		6.60	290	25.25	935	3
				1.0	0.00	-2.0	enc enc	16.50	6.75	3
m			Consess Datacous legs	13.0				12.00	2.00	5
		2.00	Govest	2.6 16.7	4.25	2.5				
			STE CORR	10.0	1 17	-13				1
MY5	85.75	62.25	HT Com 16	36.1		12			10.63	
gic	57.17	222	Mr enchalter	3.5						
225	26.25	4.73	Bertau Copp			0.0				
额	12.00	1.73					atc	46.00	5.88	
				7.3		4.3	NYS	12:30	5.25	1
				2.7		6.8	310	75.50	2.96	116
				6.3	0 45	-5.6	atc	22.75	2.96	ı
				15.2	5 60		gic	22.77	675	×
		30.39	Montates fautcom LTP	26.8			otc	315		
010			Moretan Nac.	97.3	4.7					
		27.00	MeanCost	- 30 1						
OTC	33.00	14.10	Print County County Cour.	- 20 J	1 01					
OTC	6.17	5.10	Parrangus Come					33.88		
att.	30 50	93.25	Pertion Inc.							
m	75.00	15.00	Scientific Atlantaine.					25.50		
800	75 CC	25.00	Sourcestrone Bell Comm				OTC		2.75	
							one	29.25	1700	
			STANDARD MICROSYSTEMS CORP.			4.7	MYS	24.54	2.3	H
					5 45	14. 0	AYS OTC	90.4	22.5	
			STRUTTICS CHEMINICATIONS	34		9.6	877	- 11.16	B.	
				21			erc	11.2		
			PRISMAPHE BUT'S WC.	23.5	8 12		in a			
ěĸ			15 Reserves	44	5 62		877			
495	45.00	27-27	OS WEST NO.	49.	9 33					
670	55.39	12.00	Mississist Committees and the Committee of the Committee	15.5						
Oto	15.50	7 00								
							NYS			
8							GTC	90	6.0	
Ott	140		ADMAGED LOGIC PASSANCE				OTO	10.3		
					00 -07	3 18	ASC	0.6	3 3.7	

			A11	0.11	2.5							
		Francia Constituent			2.5	200	11.88		Agyances Micro Services			
		Pactuments Come:	20.63	613	23	842	21.39					
						070	23.50					
			31 63	6.89	2.6			3.15	Carrians Trompitors			
						OTC	7.25		Consisse			
					6.3	one	29.25	1700	Constact Spinctestocree County			
		STANDARD MICROSYSTEMS CORP.				MYS		2.36				
15.10	0.55							4.25	DALLAS SERVEDROGETOR	11.F3		14
42.75									Invit Com			
		Texturcione (1)										
7.00	1.63									75.75	-1.50	-3.5
		PRINCIPLES BUT'S WC.										
		15 Roserret	21.90	4.75	1.7							
					25				Sarross Stenomer/104-90			
		WOLSE, COMMINICATIONS	49.88	3.37	**	000	16.50	6.50	Serea Someonewites			
				1.25		000		22.75				
							4325	24.73	Treas betweenth			
						NYS	76.88				1 50	
									VLSI Security out			
140		ADMAGED COME PANAMICA							WOTER	E-63	425	41
45.75		APPLE COMPLETENCE (L)						3.73	WALKERS DIGITIES COMP. E.J.			
		ACT STORY AND A THE								36 50	2.13	6.7
24.25	11-25										2.50	23
		Commonweal No.		0.25								
	24.00	Command Communes Comm	53.47	1.25	14.7							
			21.00									
			82.88	2.13	2.4	200	1921	11.25				
			56.29		4.7			13.54	Barcine Mc.			
					4.0	210	24.66		Casser Com (1)			
					23	enc		5.75				
	233	Zenn tergonamment LTD.				ASS	16.38	6.50	Coursement Com-	9.50	6.50	
									Counce President (1)	37.75	911	65
									Capabing Siconductors Inc.			46.7
										15.75	-350	
			ND.							9.00	613	2.4
		Amban Cosp.				N/G		5.04				
	4.25	COR MEX COMPLYTO	113	6.00	131.1						-0.25	
										15 30		
		Com Paseance Inc.	24.86	13.50	* 5.5	orc	13.00	12.21				
				0.30	3.3							
							79.30	7.09				
							8.88		Towers Com.	8.00	0.75	X1
						gtc	2125	3.75				-6.8
22.00	5.50	Expans Square Partners								17.25	15.25	
		MariesenaLiterature							Master .	6.63	6.13	1.9
127.50						6/10				6.13	4.90	-12.5
33.75		DECT GAME	31.75	49	361		117.60					
		Pagestan Courter	98 97		6.7							
						W/S	12.31					
		Sequent Computers vs.	17.00	1.3	-24	300	17 00	2.7			975	
				-621	-6.3							
							12.75	3.1		14.30		
						MY5	26.50			4.73		
24.50	10.91								Drama Inc.			8
							22.50		SAMAN TECHNOLOGY	15. 26		
13.66	0.75									35.54		
										24.36	6.36	1.4

Ame 25 Me Nov You Play Date: 52-West Rooms

74.00				-111	12.7						
					-9.2						
14.75			7.75	4.17	1.4				ARRESTA MORT STETERS	14.00	
28.13		Add Community Systems	10.75	4.36	34	915	23.75	14-25	SAME CASE OF STREET	2.12	
							4.73	2.30			
11.00					0.0	9075	35.75	14.25	AANATOTS INTO	25 13	
							54.13	35.25		14 25	
					1.9	MYS	17.75	11.53	Campan Cook	14.75	
36.25					0.0		12.30		Commornius.	2.0	
12.00	17.00			-175		010			Compatible Hospitals		
							89,59	57.00	COMPANY SCANCES	7.00	
5.36					11.3	HYS.			COMPATER TABLE GROUP	12,86	
	8.27					MYS			CountSAIec.	11.00	
19.50	543	Creations.			32	OTC OTC			Correspond Services		
20 39	15.13	COMPUTERALISCATES							Encount Document Sorraine	6.38	
	123	COMPLETENTION CORP.				822				30.43	
12.30	1925	COMPLETENCIA CORP.	26.75							20.75	
34.25		COMPRISED IN								12.75	
1473	5.73				-1.5						
17.25	10.73	Coass Coop.	5,50	423	4.1	900 900 900 900					
23.00	5.25	Easts Cour	19.56		2.1		43.00				
23.75	17.00	are Ownstion	5.75	4.11	-2.1	MYS.					
		Franciscon Technology		1.10	15.0						
	8,10	Geour I Servens			15.0	010	73.00				
	17.30		37.16	0.75	3.3			17.73		12,00	
				6.78	23	atc atc	1241				
22.75			18.41				22.75	18.25	Sorread Secretario		
		SPERMATION PROPERTY.		4.75	-2.1	OfC	13.75	22.50	Sales and Date Selection		
			23.71	0.50	2.2		13.73	2.17	Un trease Cour.	125	





\$59 -6.13 \$57.0.28 \$57.0

Computer Industry

Hynex to shed unit z Corp. last week d to sell The BIS

er of software and us, to ACT Group in ugham, England, for million, BIS is best ation services. The deal pected to close next th. Not included in the sition was BIS' Nor-

Cognos posts profit
Cognos, Inc., an Ottawa ap-plication tools vendor, post-di first-quarier fiscal profits of \$100,000 (Canadian), a 50% declins from the compa-rable period insit year. Reve-aue in the period rose 2% to ion (Canadian)

EMC sets acquisition EMC Corp. has agreed to acre Magna Computer p., a Salem, N.H., develor of IBM-compatible Ap-cation System/400 tapege products. Terms of

ed its acquisition of CGI ormatique, a Paris soft-re and selvices com-ny. . . SunGard Data

Systems, Inc. in Wayne, Pa., has agreed to acquire Sun Data, Inc.'s AS/400 disaster p., a Milpitas, Calif., disk ve vendor, expects fiscal st-quarter profits to be be expectations due to con-

ing pricing pressure.... a Waltham, Mass., de-per of visual compating ware, has acquired Jag-Software, a provider of alization technology for

New kid on management block

Start-up's software tracks and manages systems across enterprise network

SACOLS BROOK, K J.

**One of the computer industry's newest players is trying to dent the market for software used to manage computers

throughout an enterprise. Called Novadigm, the upstart recently showed off its wares in semi

country: Headed by two former Pansophic, Inc. managers, the company has a war chest of almost \$7 million in start-up capital and has about 10 paying customers for Enterprise Desktop Manager (EDM), its family of client/server software management packages Another 15 customers are slated to begin trials shortly, ac-cording to H. Kent Petzold, president and chief executive

in New York helped Novadigm develop EDM during the past two years and plans to use it to help distribute and man-age software on the more than 10,000 workstations going into its branch offices na-

"We're changing our environment from dumb terminals to intelligent worksta-tions," said Mohammed Mosand, senior vice president of Prudential. "We want to be able to manage everything from our con tral site in New York. This product is very important to us."

Novadigm officials said that when a user changes the desktop configuration, or if a automatically or on demand.

The applications run across multiple platforms, in-cluding IBM mainframes, OS/2 and Windows: Unix sup port is planned within the next 12 months.

Similarly, EDM supports communications protocols such as IPX, NetBIOS, Transmission Control Protocol/In ternet Protocol and IBM's Systems Network Architecture. At the core of EDM is an object-oriented architect

that includes a server, client and an administrator component. The server contains a proprietary detabase that configures and manages software

based on company policies.
Users can integrate their existing sys tems management software into EDM, in-cluding IBM RACF mainframe security and NetView network management, and can al so integrate into EDM data repositories from other third-party suppliers. Prices are \$25,000 for the server and administrator and \$100 per elient. All the systems

with the core system.

The main idea behind EDM is to provi The main idea behind EDM is to provide a tightly integrated set of applications that can track and manage software serous as entire caterprise. "It's a question of managing direculty," said Albion Pittagerald, Novadigan's chairman and chief technology officer.

Good potential
One outside observer gave Novadigm—
which stands for "new paradigm"— a good
chance of success. "The founders have a
proven track record, have good handing. d the technology is pretty sophistical ed," said igor Stenmark, an spatyst at Gartner Group, Inc., a consulting firm in Stamford, Conn. "They're providing a poli-cy-based mechanism for controlling desk-

At the same time, however, Novadigm is battling a bery of well-entrenched compet-

Many vendors are trying to get a piece of the enterprise systems management mar-ket, including traditional players such as Candle Corp., Legent Corp. and Computer sociates international, Inc.; start-up aprise Technologies in Pittsburgh an envision Corp. in Pleasanton, Calif. hardware suppliers Novell, Inc. and IBM; and application software vendors such as crosoft Corp.

Novadigm was founded in 1990 and he 22 employees. The company plans to se EDM through direct sales and value-adde

Amdahl, EDS ally to provide cross-platform development 041144

Amdahl Corp. and Electronic Da Systems Corp. have formed a venture to provide users with tools to handle cross-platform application development in areas ranging from business rules to work-flow

Known as the Antares Alliance Group, the venture will oversee on-going development and integrate Amdahi's Huron prototyping de-velopment tools and EDS InCase and Apache modeling software by mig-1994.

The two companies seek to le-verage EDS' clout as a systems integrator and the complementary features of their product sets to

target users wanting a single source to define, develop, test and moute applications. Industry analysts were po

in their assessments of the bene-fits of uniting the products, though they said Antares will face a chalage in effectively marketing them. After two years of shipping Huron, for instance, Amdahl was only able to gain a user base of 50. Brenking into an arena saturated with development tools was no easy task for a company that has mainframes as its primary busi-

EDS niso has competing alliances to juggle. For example, EDS is cur-

Texas instruments, inc.'s IEF application tool kit, which comp

Haron is a preotyping tool that allows access to multiple disabses for its proprietary dashase re-portery it also provides the abili-ty to externalize business rules and built them time applications, said Jim Sinur, an analysi at Gart-per Group, inc., a consusting rule in Stamford, Com. And InCase of fers modeling capabilities that of the said EDS. Anoche offers the ability to inno-Huron is a prototyping tool th lacking in Huron, he said. EDS' Apache offers the ability to incor-porate work flow in applications. "If they build bridges across those three, they will have one of

the few products that covers the whole life cycle from business rules through to work-flow analy sis," be said. Antares officials said they will use Amdahi's and EDS di

INDUSTRY PULSE: Midrange systems

The recent surge of Unix-based client/server systems being installed hupturn in what was a shrinking midrange market





1971 marries 2		1991 SMALL F	TOTOMS - 1
iBM .	3,150	IBM	30,115
DEC	2,807	DEC	23,313
HP .	1,181	NCR/ATAT	11,808
DG	1,060	Unisys	9,070
Sequent	. 543	Sun	7,895
2972 marie 9	VETTONS	1992 SMALL S	-
IBM	4,866	PENA	31,820
DEC ·	1,535	DEC	24,915
DG ·	772	HP	10,787
HP .	670	Sun	7.970
Tandem	630	NCR	7,159

midrange systems as those that comprise both small-scale (those costing 5 so,oo to \$500,000 and supporting two to 32 users) and medium-scale those costing 5 so,oos to \$1 million and supporting 33 to 135 users) systems.

or International Data Corp. EDC), Framingham, Mann.; Gertner Yandscick, Standard, Corp.

The 5th Wave by Rich Tennant



sidelines

embert of Openin & Ge. As a transcript. Exemples have been described by the common medical control of the common control of the control of the

Licensing at wor

discounting to represent the control of the control

Marthern suppose

Councids to their growth frontiers the outcommons those days, the Northern Tylosom pay in the time of anni point, the behavior, and the control of the council of the council of the council of the end of the densities by the great of groups, in behavior, Corp., for a day that and occurs without a few read to believe. Interest I growth of the council of the council of the council of the council of the North Corp. The council of the council of the council of the positions appear to the council of the council of the positions and the council of the council of the council of the art down ETR, which were lawy trying to done the carrier day belt Tolkesse days. I was severe if the Protection platent, according to the council of the council of the council of the council of the Tolkesse days, we are severe if the Protection platent, according to the council of the council of the council of the council of the tolkesse days are severe if the Protection platent, according to the council of the council of the council of the tolkesse days are severe if the Protection platent, according to the council of the council of the council of the tolkesse days are severed to the Protection platent, according to the council of the council of the council of the tolkesse days are severed to the Protection platent, according to the council of the council of the council of the council of the tolkesse days are the council of the council of the council of the tolkesse days are the council of the council of the council of the tolkesse are the council of the council of the council of the tolkesse are the council of the council of the council of the tolkesse are the council of the council of the tolkesse are the council of the council of the tolkesse are the council of the council of the tolkesse are the council of the council of the tolkesse are the council of the council of the tolkesse are the council of the council of the tolkesse are the council of the council of the tolkesse are the council of the council o

todaya Maretha Mare

Although Liking Despited Services images also due to produce the services and the services are serviced services and produced to the services are serviced services and the services are serviced services and the services and the services are services as the services are services as the services are for the services and the services are services as the services are services are services as the services are services as the services are services are services as the services are services as the services are services are services as the services are services are services as the services are services are services are services are services as the services are services are services are services as the services are services are services as the services are services are services as the services are services are services are servi

coted agreement between 1984, Maxtor Corp., Seague togy, Inc., Testifies Corp., and Smillett Corp. to make their I, hard driven interechanguable has been delayed. Sources deal in more terripoted for a mid-July amountament (CR

That is a manuel Proposal for the large MINE, The School shows to Companion of Many and Mine School School

BANNER TAPE DRIVES



NOW SOLD UNDER THIS BANNER.



We've brought the best names in tape storage-Archive, Maynard, Irwin and ARDAT-under the Conner banner. Giving us the broadest selection of total storage solutions in the industry.

You've known Conner as a leading supplier of hard disk drives for personal computers and workstations. Now, we've become the industry's leading supplier of tape drives,

storage management software, bundled storage systems and worldwide distribution.

With our complete family of 2.5-inch and 3.5-inch disk drives, in capacities ranging from 85MB to 1.37GB. For everything from

workstations to desktops, to notebooks. To our backup storage solutions featuring a full line of tape drives from minicartridges (DC-2000) and 1/4-inch cartridges (DC-6000) to 4mm DAT and 1/2-inch DLT tape drives. Plus, combined storage systems from entry level data storage to complete network solutions. And the storage management software to tie it all together.

So when you're looking for the world's best storage solutions, look for the Conner banner. Call 1-800-5-CONNER. We're

creating a revolution in storage and delivering the right answers for the world's changing computer needs.

OUR COMPETITORS ARE SO CONFIDENT OF THEIR PRODUCTS, THEY GUARANTEE THEM TO LAST A THIRD AS LONG AS OURS.



why all PCs are not the same.

That there are important differences in quality. And reliability. And compatibility. That, in the end, COMPAQ

computers are designed to help you get more

done with fewer problems.

But we also know that this could sound like an empty advertising promise if we didn't

back it up. So we do. Because unlike others who charge for extended coverage,

all of our affordably priced PCs include a 3 year warranty with one year of on-site service." Free. .

And only a company that offers a better product can offer a better guarantee. For a reseller near you, please call us

at 1-800-345-1518. COMPAQ

There's a common misconception today that computers are all alike. That they're made from the same components. That a box is a box is a box.

Well, here at Compag, we have over 9,000 employees who could tell you